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Networking as a means to promote the adoption of innovations in hospitals

by

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Abstract

The present master thesis is an evaluation study of an important aspect of a major transformation in health care provision that we currently witness. A specific aspect of this transformation it to embed health care closer to patients' daily life. One project that is part of this movement towards delivering care closer to patients' home is medication@home. This project is undertaken by the mProve network of seven Dutch hospitals, established in March 2020. Although networks seem to be promising for the transfer of knowledge, the performance of organizations and the invention and diffusion of innovations, it is the question whether these benefits are enjoyed in practice. Therefore, this master thesis addresses the main research question: *What determinants of innovation in the mProve network promote the adoption of medication@home in the associated hospitals?* To answer this question, a case study is conducted. The hospitals and the network are represented by the project leaders of medication@home. Twelve semi-structured interviews are conducted. The results indicated that hospitals differ in the developmental stage of medication@home and this depends, but it is difficult to assess these stages, because these are not strictly separated. Ten determinants are assessed and all have an impact on the adoption of medication@home, but formal ratification is the most important determinant at the organization level. The amount of structural and incidental connections of the project leaders differ per hospitals, but this does not necessarily have an impact on the adoption of the innovation. Finally, the network is promising for the adoption of innovations within the hospitals, but networking activities should focus more on the members' needs, i.e. sharing hands-on information. This study contributes to scientific literature on innovations in the public sector and networking in the context of hospitals, by evaluating a specific case from a public administration perspective.

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1 Introduction

The present master thesis is an evaluation study of an important aspect of a major transformation in health care provision that we currently witness. Given the ageing population and the increase of multi-morbidities, healthcare systems around the world face intense pressure from rising demand (KPMG, 2019). At the same time, the number of employees working in the health care sector is decreasing for years. The WHO estimates a shortfall of 18 million health workers by 2030 worldwide (WHO, n.d.). In a recent report, the Netherlands Scientific Council for Government Policy (WRR) warned the minister of Health, Welfare and Sports (VWS) that the current health care system is not sustainable and that a new, stable policy is necessary (WRR, 2021). As a result of these societal developments, major transformations are needed to reshape the system in order to be adaptive to the future. Those transformations include the use of technologies, such as robots, domotics and telemonitoring, but also investments in human resource management. We are in the middle of a worldwide movement in order to improve care outcomes, reduce the costs and alleviate pressures on health care organisations (KPMG, 2019).

A specific aspect of those health care transformations it to embed health care closer to patients' daily life. For instance, this is visible in hospitals, where patients are only allowed to stay as short as possible and the workload for professionals keeps rising (Garrick et al., 2019). In the Netherlands, a ministerial agreement on medical specialist care states that more hospital care needs to be moved to care at home (Rijksoverheid, 2018). So-called "hospital at home" programmes seem to improve care outcomes and lower travelling costs for patients. Moreover, it should lead to a reduced number of occupied hospital beds resulting in shorter waiting lists (Clarke, 1997). Innovations can help to realise the shift from hospital to home. The COVID-19 crisis has highlighted the need for such innovations. It has led to an accelerated use of digital health care in patients' home environment, for example with e-consults. However, innovating in healthcare is a complex rather than a complicated issue with regard to the generation of ideas, the implementation and spread of innovations (Plsek, 2003).

One project that is part of the movement towards delivering care closer to patients' home is medication@home. This project aims to provide specialist care close to the patients in their trusted environment. There are various ways of administering medication at home. For example, it can be done by hospital nurses or by nurses from a regional home care organisation. Many Dutch hospitals have started exploring the possibilities for this shift for a couple of years. However, it can be difficult for hospitals to realise medication@home individually. Therefore, seven ambitious hospitals combined their powers and established the mProve network in the Netherlands. Medication@home is one project of this network, established formally in March 2020. Together, these hospitals develop new methods to improve the quality and organization of health care with different projects (mProve, n.d.A). Each hospital has a project leader who is responsible for medication@home and represents the hospital in the mProve network. The hospitals divided the different care paths and medications to be implemented, in

order to create the highest learning outcomes (mProve, n.d.B). Within the network, hospitals want to build learning capacity and collaborate in their search for the optimal organization model for the various care paths of medication@home. However, it is unclear how the network can lead to a way that synergies arise to contribute to the overarching goals, namely collective learning, innovating and reducing the costs of medication@home.

The mProve network is no exception in its field. Network-based modes of organization have emerged in many public services (Provan & Milward, 2001). Health care scientific literature shows that networks have become a more common form of organizing health care provision (Hawe, Webster & Shiell, 2004). The advantages of networking are considerable, including enhanced learning, more efficient use of resources, increased capacity to address complex problems, and better services for clients and customers (Provan & Kenis, 2008). Previous studies have found a positive impact of networking activities on organizational performance (O'Toole & Meier, 2004; Akkerman, Torenvlied & Schalk, 2012). Furthermore, networks can be beneficial for the diffusion of innovations (Hartley, 2015). This is underlined by Rogers (2003), who points out the importance of social systems. These are "sets of interrelated social units (e.g. individuals or organizations) that are engaged in problem solving to achieve a common goal" (Rogers, 2003, p. 23). A network can be considered such a social system and it is helpful to use its advantages. Therefore, coordinated networks may be part of a solution to develop innovations in order to cope with the challenges the healthcare sector faces nowadays. This study applies theories on networking an innovating (in networks) on the medication@home case.

1.1 Research question

Although networks seem to be promising for the transfer of knowledge, the performance of organizations and the invention and diffusion of innovations, it is the question whether these benefits are enjoyed in practice. Previous studies on public sector innovation and policy networks often focus on the interests and preferences of individuals, for example client satisfaction or professionals' willingness (Rogers, 2003; Tummers, 2011; Peters et al., 2017). Nevertheless, the performance of innovations cannot merely be explained by individual dispositions, but are the result of interactions that are embedded in institutions (Uzzi, 1996). In this case, the project leaders of medication@home are embedded in both their own hospital organization and the mProve network. Both these institutions can have their effects on the adoption of medication@home. Therefore, this evaluation study does not merely pay attention to the impact of inter-organizational networking activities, but also to factors at the organizational level. These determinants of innovation combined with a network approach help to understand where differences in the adoption of medication@home in the different hospitals originate. This master thesis addresses the following main research question:

What determinants of innovation in the mProve network promote the adoption of medication@home in the associated hospitals?

The independent variables of this explanatory question are 'determinants of innovation in the mProve network'. These determinants include factors at the organizational level (i.e. the hospitals) and the inter-organizational level (i.e. the mProve network). On the one hand, it is valuable to identify in what ways medication@home is supported or not by the hospitals. On the other hand, it is interesting to see how the mProve network can ensure that networking activities are useful for the associated hospitals, in order to meet its goal, namely collective learning. The dependent variable is 'the adoption of medication@home'. This adoption is assessed at the organizational level of the hospitals, because each hospital has its own strategy to embed medication@home within its structures. Due to the differences in care paths and goals per hospital, the adoption of medication@home is understood as the perception of the adoption by the project leaders of the different hospitals. These variables are conceptualized in the theory chapter.

In the process of answering this main research question, there is need for sub-questions that will provide the necessary elements to develop the analysis. The following sub-questions have been formulated:

1. *What variations in the development and implementation of the medication@home innovation do we observe in the hospitals involved in the mProve network?*
2. *What determinants underlie the successful implementation of the medication@home innovation in the hospitals involved in the mProve network?*
3. *How is the mProve network organized around the medication@home innovation?*
4. *To what extent is the network helpful for the adoption of innovations?*

The first sub-question is a descriptive implementation question that is answered by comparing the perceived adoption of medication@home in the different hospitals. The second sub-question is an explanatory question that is answered through an analysis of the determinants affecting the implementation of medication@home in the different hospitals. The third sub-question is a descriptive network question that is answered by analysing the structure of the mProve network organized around medication@home and determinants affecting the implementation of innovations. The fourth sub-question is an explanatory question. To answer this question, the perceptions of the project leaders on the networking activities are analysed. The implementation of medication@home cannot be compared in numbers for different reasons. The care paths and medications to be implemented differ per hospital. One medication is more suitable to administer at home than the other, which would make it a false comparison in terms of numbers of patients or medications. Also, not all hospitals started with actually administering medications at home, but are prior to that working on mobilizing internal departments and preparing different units for this shift. Therefore, the assessment of the implementation of medication@home cannot be valued in terms of success or failure in this evaluation study.

1.2 Societal and scientific relevance

This evaluation study is relevant for society for two reasons. First, it is useful for the state-of-the-art knowledge on the implementation of health innovations. As indicated, medication@home is a result of a ministerial agreement, which states that more hospital care needs to be moved to care at home, in order to reduce the number of hospital beds and the costs involved on the long-term. It is important to assess how the medication@home project of the mProve network can contribute to this overarching national goal. This study contributes to this current transformation in society by exploring a specific case. The determinants that have an impact on the implementation can be relevant for other health innovations in other settings as well. Second, this study gives insights in networks of hospitals who aim to collaborate and share knowledge. Within the worldwide movement towards delivering care at home, network relations have become more important for sharing knowledge and resources. This became explicitly visible during the COVID-19 crisis, where hospitals were forced to collaborate. However, networking in general remains relatively new. This study illustrates how one particular network is organized and what its effects are for the adoption of an innovation. Other and future networks can take advantage of these insights. Furthermore, this evaluation study is not only relevant for health care organizations to gain knowledge on innovating and learning in networks, but also for governmental institutions. Thus, this study helps policy makers to understand the processes that are going on within and across health care organizations.

By contributing to existing literature on innovation in public sector organizations and networking activities in the context of hospitals, this evaluation study is scientifically relevant. First, the adoption of health innovations has often been studied from a health care perspective, where for instance patient satisfaction or employee motivation are central concepts. However, it is valuable to shed light on the process of health care innovations from a public administration perspective. In this way, the focus is placed on the organizational context in which the innovation is embedded, instead of the individuals at the micro-level. This study adds to the existing literature on public sector innovation with a focus on healthcare, since it is an in-depth case study in a Dutch hospital context. Thereby, the measurement instrument for determinants of health innovations at the organizational level is used in another context (Fleuren et al., 2014a). This instrument includes a number of factors that may affect the implementation of an innovation, but this study includes other factors as well. Second, networking in healthcare contexts is understudied. More research is needed to evaluate how networks can be designed to be beneficial for the associated organizations. Existing literature on the effect of networking activities on organizational performance mainly focus on the education sector (O'Toole & Meier, 2004; Akkerman et al., 2012). This research builds on this relationship by assessing it in the field of hospital care. Moreover, managing a network is not easy. Tension may exist between the network effects at the organizational level and network effects at the interorganizational level (Akkerman, Torenvlied & Schalk, 2012). Therefore it is

important to study how mProve network can serve its goals and at the same time realise a fit with the organizations' strategies.

1.3 Reading guide

The following chapters of this thesis are structured as follows. First, relevant theoretical concepts are discussed and a framework is developed that acts as a searchlight in this study. Then, the methods used to conduct this study are described. After that, the findings are presented on the basis of the four sub-questions. Thereafter, an answer to the main question of this study is given is the conclusion. Last, the limitations of this study and its implications are discussed.

2 Theory

In this chapter, the main concepts of this evaluation study are addressed. First, determinants of innovation for both the organizational and network level are reviewed and demarcated. These determinants serve as a guidance to study the case. Second, the concept adoption of innovations is described. This chapter ends with a conclusion which summarizes the theoretical framework that is applied in this study to analyse and evaluate the case.

2.1 Determinants of innovation

Organizational level

Innovations can be categorized into various types. Medication@home can be considered a process innovation, because it is about improving the quality and efficiency of an internal process. Process innovations are often associated with older organizations, such as hospitals, that use them to enhance efficiency. Organizational process innovations occur in structure, strategy and administrative processes (Walker, 2014). For medication@home, the process of administering medication has changed. Innovations can be both intra- or inter-organizational in nature. On the one hand, medication@home is an intra-organizational innovation, because the process of administering medication has changed within the hospital. On the other hand, medication@home is an inter-organizational innovation, because the successful adoption within the hospital is reliant on other actors in the environment that are out of the hospital's control, for example funding by health insurers.

Within public sector organizations, innovation is driven by various antecedents. Fleuren et al. (2014a) developed the Measurement Instrument for Determinants of Innovation (MIDI), which can be used either before or after the introduction of an innovation to assess whether the innovation is likely to be implemented. In their instrument innovations include, for instance, guidelines, protocols or programs that are entirely or partly new for the intended group of users. Medication@home can be considered such an innovation, since it is a new way of organizing the administration of medications. The determinants are categorized for the innovation; the potential user of the innovation; the organization where the potential user works; and the socio-political context. For this study, the determinants associated with the organization are relevant for an assessment at the level of the hospitals. These ten determinants are shown in table 1. Although the MIDI can be useful for assessing an innovation, the model is quite complex because of the many determinants involved. It is interesting to see whether all these factors are equally important or if they may overlap.

Determinants of innovations associated with the organization	
1. Formal ratification by management	2. Material resources and facilities
3. Replacement when the staff leave	4. Presence of a coordinator
5. Staff capacity	6. Organizational turbulence
7. Financial resources	8. Information accessible about the use of the innovation
9. Time available	10. Performance feedback

Table 1: Determinants of innovations associated with the organization (Fleuren et al., 2014a)

The first determinant is about the formal ratification of the innovation by the management, for example by including the use of the innovation in policy documents (fig. 1, *OD1*). The second is about the presence of material and other resources or facilities necessary for the use of the innovation as intended (such as equipment, materials or space) (*OD3*). The third is about the arrangements made to take over the innovation when staff who use the innovation leave the organization. The fourth determinant is about the presence of one or more persons responsible for coordinating the implementation of the innovation in the organization (*OD9*). The fifth is about the presence of adequate staffing in the department or the in the organization where the innovation is being used (*OD5*). The sixth is about the degree to which there are other changes in progress (organizational or otherwise) that represent obstacles to the process of implementing the innovation, such as reorganizations, merges, cuts, staffing changes or the simultaneous implementation of different innovations (*OD4*). The seventh is about the availability of financial resources needed to use the innovation (*OD2*). The eighth is about the accessibility of information about the use of the innovation (*OD6*). The nineth is about the amount of time available to use the innovation for the staff (*OD7*). The last determinant is about the provision of feedback to the user about the progress of the innovation process (Fleuren et al., 2014b). The MIDI is tested in the context of preventive child health care and schools. Further research is needed to find out to what extent the instrument can be generalized to other settings (Fleuren et al., 2014a). For medication@home, the third determinant relies on the first, because staff is able to continue working with medication@home when the processes involved are clearly documented. In this case, these determinants are combined. The tenth determinant is more relevant for the use of a technical innovation instead of the medication@home program. Therefore, this determinant is disregarded in this study.

Network level

Networks have become the dominant form of organizing and governing society (Geuijen, 2011). The main idea of networking is that processes of strategic thinking around common agendas enable collective action (Hay & Richards, 2000). A network is also referred to as a pluri-centric model, meaning that there is not one centric point to which all decisions and information are related, but there are several points and strings (Van Heffen & Klok, 2000). Members are those who are 'in the network' and non-members are those who are 'out of the network'. Network members contribute different resources, share information and cooperate for mutual benefits (Sydow & Windeler, 2004). Moreover, information sharing enhances the trustworthiness of the network members (Huang & Provan, 2007). Collective decision-making is an important feature of the network and decisions can be the result of voluntary agreements. mProve can be considered a network, because all members, i.e. the seven hospitals, are more or less equal and can bring in their resources, i.e. knowledge on their experiences with medication@home. Much literature on innovating in networks refers to collaborative innovation in the public sector, with a focus on collaborations between governments and organisations (e.g. Sørensen & Torfing, 2011). This is excluded from this literature review, because the mProve network is a form of

sideward networking (Bekerom, 2016), where equal institutions, i.e. hospitals, collaborate in the search for the optimal organization model for the various care paths of medication@home.

Three different modes of network governance can be distinguished (*ND1*). The first is shared participant governance, where the network is governed completely by the organizations within the network. This results in a dense and highly decentralized form. The second is lead organization-governed networks, where one organization is a highly centralized network broker who decides on the issues in the network. The third is governance by a Network Administrative Organization (NAO), where a separate administrative entity is set up specifically to govern the network and its activities (Provan & Kenis, 2008). Four conditions affect the adoption of each governance form, namely trust, size, goal consensus and nature of task (Provan & Kenis, 2008). The mProve network can be considered a form of shared participant governance, which is characterized by a relatively low number of members, mutual trust and goal consensus. This form of network governance demands participation of members and creates a high rate of involvement. However, decision making and performance sometimes tend to go slow, due to the lack of a steering and deciding actor (Geuijen, 2011).

Besides the modes of governance within a network, the function of a network is important to keep in mind when analysing a network *(ND4*). It is relevant to study whether all stakeholders involved have the same idea about the function of the network. Service implementation, information diffusion and problem solving are three functions that networks can have (Milward & Provan, 2006). The mProve network can be considered an 'information diffusion network', which can be defined as "a network whose central purpose is to share information across organizational boundaries to anticipate and prepare for problems that involve a great deal of uncertainty" (Milward & Provan, 2006, p.6). However, inter-organizational networks, like the mProve network, often have more than one function, for example information diffusion and knowledge exchange, learning and innovation (Popp, 2014). The knowledge exchanged has two dimensions. On the one hand, there is explicit knowledge, which can be codified and communicated easily in words, numbers or charts (Agranoff, 2006). Information on the number of medications administered at home is an example of explicit knowledge. On the other hand, there is tacit knowledge, which is embedded in the senses, individual perceptions, experiences and intuition (Agranoff, 2006). For example, the different hospitals can have different experiences with medication@home. In this way, a network is superior to an organization, because there is a greater diversity of knowledge within a network than in one organization (Dyer & Nobeoka, 2000). However, it is worth studying whether both explicit and tacit knowledge are shared within the mProve network.

Networking activities as a stimulus for innovation

Cooperation in a network can be beneficial for the adoption of an innovation within an organization (Hartley, 2015). Cooperation refers to the act of working jointly with others; it can be occasional or regular; it can occur within, between or outside formal organizations (Agranoff, 2006). Being part of a

network is making use of an external opportunity for the organization. The network can be considered an organizational capital resource. This enhances the competitive advantage of the organization (Barney, 1991). So, being part of the mProve network is a way for a hospital to distinguish itself from other hospitals. Moreover, the locus of innovation is to be found in networks, not the individual organizations, because it provides access to knowledge and resources that are otherwise unavailable (Powell et al., 1996). However, merely the existence of a network is not a guarantee for success. Information sharing is necessary for collaboration, but it is not sufficient for it to thrive. Instead, mutual benefits are needed (Thomson & Perry, 2006). Two concepts are important to understand the way networks can be supportive for the adoption of innovations, namely organizational learning and knowledge management.

Organizational learning (*ND3*) has been mentioned by Walker (2014) as an internal antecedent for innovation. Organizations that engage in social interaction through collaborative action tend to practice organizational learning, which has positive consequences for the adoption of innovations (Walker, 2014). Learning underlies all public service reforms, because all organizational change involves new knowledge and this requires learning new ideas and practices (Hartley & Rashman, 2018). This can be fostered in networks. Networks offer a more innovative structure that can help to address complex issues. Network embeddedness benefits the development of learning capacity, innovation and trust among the organizations involved (Schalk, Torenvlied & Allen, 2010; Uzzi, 1996). Establishing a culture of learning increases the sustainability of the network, for example by sharing best practices (Mervyn et al., 2019). All in all, learning is a temporal precursor to innovation. Increased skill in inter-organizational learning can lead to developments in innovation capacity and skill. Then, innovative capacity is built over time with increasing experience and confidence in using learning from other organizations (Hartley & Rashman, 2018). So, it is important how learning within the mProve network is assessed by its members to answer sub-question 3 about the organization of the mProve network.

Additionally, learning can be fostered within organizations (*OD8*), which is relevant in this case to study sub-question 2 about the determinants that underlie the successful implementation of medication@home. Significant effects of the development of a so-called learning organization on innovation in the hospital context are demonstrated by Dias and Escoval (2015). Learning organizations are better able to apply different sources of knowledge for innovation development. Several mechanisms are in place to promote teamwork and learning across departments, such as a clear division of functions and tasks or institutional structures that link elements of the hospital care and administrative processes. A culture that encourages problem solving in new ways across the whole organization is necessary for learning within organizations. Increasing this internal capability is a prerequisite for the next step, namely effectively assimilating and applying knowledge from outside (Dias & Escoval, 2015).

Next to building learning capacity across and within organizations, knowledge management (*ND2*) is an important determinant for the adoption of innovations and it is relevant to assess how knowledge

management is ensured within the hospitals and the mProve network. Knowledge management is "the process of bringing together explicit and tacit knowledge and displaying and manifesting it" (Agranoff, 2006, p. 60). One form of knowledge management is by creating strong ties which ensure that the network is efficient at tacit knowledge transfers (Dyer & Nobeoka, 2000). This idea is underlined by Klijn, Steijn and Edelenbos (2010), who argue that connecting strategies are most promising in realizing outcomes. Strong ties can be identified as short lines of communication, not only in formal, but also in informal ways. Within the mProve network, strong ties increase the ability to share best practices. Within the hospitals, strong ties are beneficial for translating the network outcomes into the organization's project on medication@home. Another form of knowledge management is by assigning knowledge brokers. These foster commitment and mutual understanding by engaging in activities that are related to finding, appraising, transforming and disseminating relevant knowledge (Conklin et al., 2013). According to Mervyn et al. (2019), networks need a strong, energetic and strategic leader that can hold the centre. Within the mProve network, the leader can function as knowledge broker. Also within the hospitals, it is important to examine how the transition of knowledge from the mProve network towards the hospital is formalized (*OD10*). It is interesting to identify the possible differences in power and mandate of the project leaders of the different hospitals, since these may affect the adoption of medication@home.

In order to exchange knowledge and build learning capacity, it is important to know what each other's resources are. All hospitals undertake a pilot for one or more care paths and share their best practices within the mProve network. This can be understood from a hospital's perspective as a search for efficiency, since piloting all care paths would be extremely cost- and time-consuming for one hospital itself. In this way, transactions occur between the hospitals in the mProve network (Williamson, 1981). However, all transactions come at a price. It is relevant to define what investments have to be made, in order to be part of the mProve network and reap the rewards. These investments do not merely have to be financial, but can also be forms of human capital for example (*ND5*).

2.2 Adoption of innovations

It is needed to examine how differences in the determinants of innovation affect the adoption of medication@home. The adoption of innovations in healthcare is difficult due to the complexity of the systems (Plsek, 2003). Moreover, most measures to assess the performance (of an innovation) rely on the availability of quantifiable data, such as outputs, efficiency, service outcomes and responsiveness (Walker, Boyne & Brewer, 2010). Measuring performance of innovation difficult in this case, because of the explorative nature of this study and the fact that those numbers of data are not available. Therefore, literature on performance measurement is excluded for this study, and a rather subjective approach for assessing the adoption of innovations is used. Subjective measures are common in innovation literature, for example when asking stakeholders in retrospect to assess the performance (Blindenbach-Driessen et al., 2010).

Distinguishing different stages of the innovation process is problematic, because innovations are complex phenomena that are not easily categorized. However, in his classical theory on the diffusion on innovations, Rogers (2003) identifies five stages of the innovation process in organizations that can be used to identify differences in the adoption process among the hospitals (*OA1*). The first is *agenda-setting,* where the problem is identified and prioritized. The second is *matching,* where the problem is conceptualised to suit an innovation. Together these two stages form the initiation phase, where information is gathered and conceptualised and a planning for the adoption of the innovation is made. This phase is at least partly completed for medication@home, since the hospitals committed themselves to the mProve network in order to further develop medication@home. However, it is questionable to what extent medication@home is incorporated within the organization's strategic plans. The third stage is *redefining/restructuring*, where the innovation is modified and re-invented to create a fit with the organization. Also, organizational structures are altered to adopt the innovation. In this stage, changes can occur in both the organization and the innovation, which can lead to uncertainty. The fourth stage is *clarifying*, where the relationship between the organization and innovation is defined more clearly. The innovation is more frequently used within the organization. The fifth stage is *routinizing*, where the innovation becomes an ongoing element in the organization's activities, and loses its identity. The innovation is fully incorporated and other activities respond to the innovation. This stage can be considered as the upscaling of the innovation. The latter three stages together form the implementation phase, where all events, actions and decisions are involved with putting an innovation into use. These stages give the impression of a structured process. However, innovating is not a linear process. It can be difficult to determine what activities belong to what stage; stages may overlap; and even steps backwards are possible in the innovation process. Nevertheless, this distinction of stages can be used in this study to assess the development of the adoption of medication@home in the different hospitals.

Another way of assessing the adoption of medication@home in the different hospitals is to assess how the network relations can contribute to outcomes at the organizational level. Provan and Milward (2001) developed a framework to evaluate networks at three levels of analysis: community, network and organization/participant. In this case, the latter is most relevant. Effectiveness criteria at this level include enhanced legitimacy (*OA2*), resource acquisition (*OA4*), costs of services (*OA3*), service access and client outcomes. Enhanced legitimacy can be especially important when a network is constituted around a controversial topic. The more organizations or actors that stand behind the networked topic, the more legitimacy to be gained (Provan & Milward, 2001). The benefits of resource acquisition and lower costs of services are a form of collective benefits. These can emerge from symbiotic interdependencies, meaning that one actor's actions contribute to another actor's actions or goal achievements. Combined resources contribute to goals of both participants, that they could not reach on their own (Fenger & Klok, 2001). In this case, resources can be understood in terms of knowledge gained from the network. The benefit of increased service access (Provan & Milward, 2001) is not relevant for

the mProve network, since the network does not collectively provide one service to patients. Instead, the network is aimed at knowledge exchange among the associated hospitals. The benefit of improved client outcomes (Provan & Milward, 2001) is relevant for the hospitals, although data on patient satisfaction regarding medication@home is not available yet. It is relevant for this study to assess whether the different hospitals experience these benefits that may arise from the mProve network for the adoption of the medication@home innovation within their organizations.

Performance of the network

Besides the effects of the network for the adoption of innovations within the organization, at the mProve level, network effects may arise as well. Even though network organizations may provide excellent services on their own, overall network outcomes may be low (Provan & Milward, 1995). Thus, performance of the network needs to be treated as a separate issue. Provan and Kenis (2008) appoint some deficiencies of existing literature on network performance. For instance, the concept of network performance is often poorly specified, which can produce problematic recommendations. They argue that any criterion can be used to assess the performance of a network, for example efficiency, goal attainment, growth or learning, but it is important to be explicit about those criteria. A network can score high on a certain criterion, but at the same time low on another criterion. The exogenous theory of network performance suggests that this can be due to factors that are out of network management's control (Kenis & Provan, 2009). For instance, the structural form of the network can have consequences for what the network can actually achieve. The previously described shared participant governance (Provan & Kenis, 2008) seems best suited to small, geographically concentrated networks where full and active face-to-face participation by network participants is possible. Efficiency is hard to achieve within these types of networks. Also, the developmental stage of the network is an important factor that is out of the management's control. For example, in newly emergent networks, goal attainment is more difficult. In this stage, most of time is spent on developing network structures and processes, rather than achieving outcomes. The mProve network is relatively new, which has implications for its performance.

Another factor that is out of network management's control, but has an impact on the adoption of innovations, is the type of network. Voluntary networks are created bottom-up by the organizations that participate in the network, whereof mProve is an example. In these type of networks, three outcome criteria are relevant (Kenis & Provan, 2009). First, network legitimacy is important (*NA1*). In this case, especially internal legitimacy is needed, meaning that a network is positively estimated by those participating in the network (Huang & Provan, 2000). This is also referred to as support of stakeholders and can for example be measured by the extent to which there is agreement on the goals (Mandell & Keast, 2007). Second, the network's activating capacity is important (*NA3*), which means the ability to keep the network going. This is underlined by Mandell and Keast (2007), who state that the relationships within the network are more important than its effectiveness. Especially in this development phase of

the network, major successes in terms of effectiveness should not be expected. Third and last, the network climate is important (*NA2*). This means that there should be a balance between the accomplishment of organizational interests and the willingness to go beyond their own organization's interests in the network. For example, it can be costly to invest in the network, which may seem a waste of time according to the organization, but the long-term goals should be kept in mind there. It is relevant for this study to discuss these criteria, to assess how the network is valued by its members.

The framework by Provan & Milward (2001) can also be used for evaluating the network at the network level, in order to know how the network as a whole can flourish. Relevant criteria for the mProve network at this level include network membership growth; relationship strength; creation and maintenance of a network administrative organization (NAO); costs of network maintenance and member commitment to network goals. Since the mProve network is new, it can be expected that the relationships are not strong yet and the costs of network maintenance are high, since efficiency is not feasible in newly established networks (Provan & Kenis, 2008). The goal of the mProve network regarding medication@home is to learn from each other and collaborate in their search for the right organizational model to provide medication@home (mProve, n.d.B). Therefore, it is relevant to assess the performance at the network level in terms of learning and members' commitment to the network goals (*NA4*).

2.3 Conclusion and framework

In this chapter, theories that adhere to variables of the research question have been discussed. In sum, the theoretical construct can be conceptualized as follows (fig. 1). First, the independent variables are the determinants of innovation. At the organizational level, eight determinants of innovation derived from the Measurement Instrument for Determinants of Innovation (MIDI) are relevant, namely formal ratification (*OD1*); material resources and facilities (*OD3*); presence of a coordinator (*OD9*); staff capacity (*OD5*); organizational turbulence (*OD4*); financial resources (*OD2*); information accessible (*OD6*); and time available (*OD7*). Additionally, organizational learning (*OD8*) and knowledge management (*OD10*) within the organization are important determinants at the organizational level. Organizational learning includes the internal capability to solve problems in new ways. This concept is partly covered in the MIDI, for instance the formal ratification of the innovation and the resources available to develop the innovation. However, the MIDI does not specifically pay attention to the learning aspect, so this has to be included separately. Knowledge management is also partly covered in the MIDI in two ways. Strong ties can be considered as part of staff capacity, because it matters how staff communicates and whether they can reach out to each other about the medication@home innovation. The presence of a knowledge broker is similar to the presence of a coordinator as in the MIDI. Another aspect of knowledge management, namely about its storage within the organization, is not included in the MIDI and should therefore be assessed separately.

At the network level, the determinants of innovation include the mode of network governance (*ND1*) and the function of the network (*ND4*). Moreover, organizational learning (*ND3*) and knowledge management (*ND2*) within the mProve network are important determinants of innovation at this level as well. The former includes sharing best practices and the establishment of a learning culture. The latter included the identification of strong ties and the presence of a knowledge broker. Last, the transaction costs (*ND5*) involved in the network may have an impact on the adoption of an innovation, which is about the balance between the investments to be made for the network and the revenues achieved.

Second, the dependent variable is the adoption of innovations. At the organizational level, the five innovation stages (*OA1*) identified by Rogers (2003) can be considered for a rough categorization of the medication@home innovation in the different hospitals. Also, the effectiveness criteria by Provan and Milward (2001) are important concepts to assess whether the mProve network contributes to the adoption of medication@home in the different hospitals. These criteria include enhanced legitimacy (*OA2*); resource acquisition (*OA4*); lower costs of services (*OA3*); and other benefits that may derive from the mProve network for the hospitals (*OA5*). Furthermore, it is relevant to assess different aspects at the network level, such as network legitimacy (*NA1*), network climate (*NA2*) and the network's activating capacity (*NA3*), because the functioning of the network is important for the transfer of knowledge towards the associated hospitals. Also, the commitment of the members to the goals of the network is an important aspect at this level (*NA4*). The mProve network cannot be successful, without proper organization of learning and knowledge management within the hospitals. Therefore, this study contributes to the outcome of networking activities at both the organizational and the network level.

Altogether, the variables and its adherent dimensions are summarized in the framework in figure 1. These variables and dimensions act as a searchlight in this study to identify the determinants that affect the adoption of the medication@home innovation in the mProve network. Based on the theoretical discussion, it may be expected that if more determinants of innovation are present, this leads to a better starting position for the adoption of the innovation at the organizational level. Also, the more attention within the network paid to organizational learning and knowledge management, the better the network's performance is valued by the members. In the theoretical framework, an arrow is drawn between the dependent and the independent variables. This indicates that higher perceived adoption of medication@home may in turn lead to more organizational learning and better knowledge management. Innovating in organizations is an ongoing process with factors constantly reinforcing each other (Plsek, 2003).

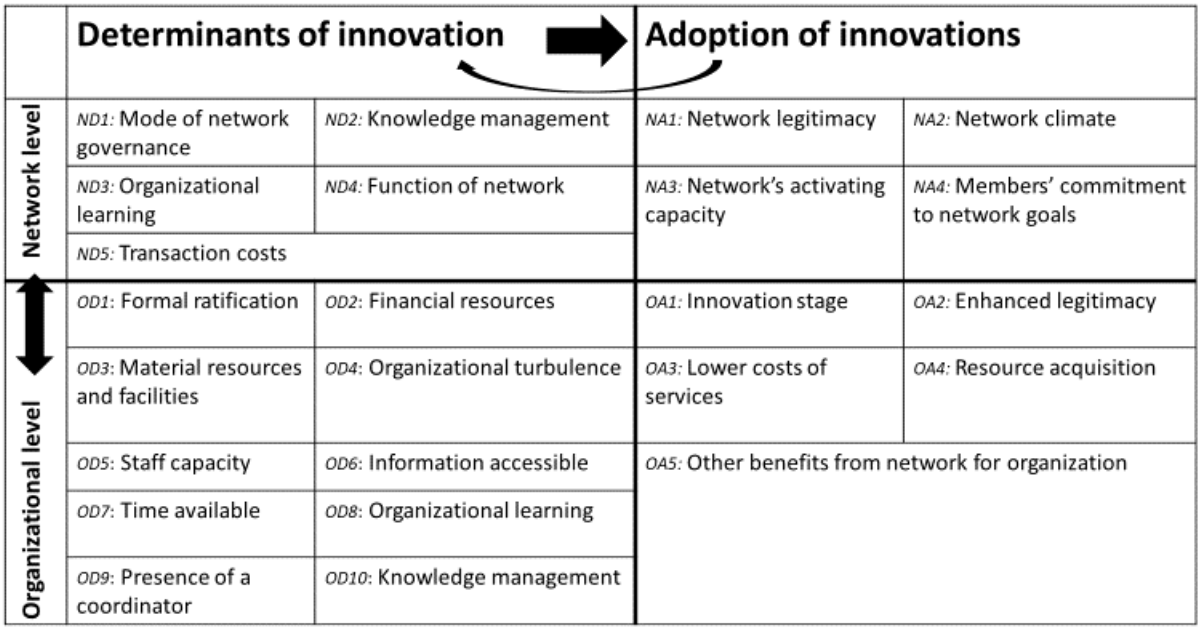

Figure 1: Theoretical framework

3 Methodology

In this chapter, the methods used in this study are explained. The research design, sample, operationalisation, data collection and analysis are described. Next to that, the criteria for measurement quality and ethical issues are considered.

3.1 Strategy and design

This study is interested in the determinants of innovation that affect the adoption of the medication@home innovation within the mProve network. Thereby it is focused to explain this relation in detail and therefore this study has a qualitative approach. The design is a case study, which means that this study entails a detailed and intensive analysis of a specific case is done (Bryman, 2016). In this study, the organization of and the network organised around medication@home is explored and evaluated. A case study is suitable for this research, because of its applied nature and aim to contribute to a real-life issue (Van Thiel, 2014). The qualitative approach is helpful to gain insight into the perspectives of the various stakeholders and to deeply understand the case (Boeije, 2016). The unit of analysis consists of the mProve network and the seven associated hospitals. The hospitals are considered to be homogenous, based on their size and top-clinical status (mProve, n.d.). On the contrary, they have different experiences with the determinants of innovation in the different hospitals and also differ in the adoption of medication@home.

3.2 Sample and sampling

All seven hospitals and the mProve network are included in this study. However, within these institutions, the right respondents have to be recruited as the units of observation. This study focuses on the adoption of the innovation from an organizational perspective. To capture this perspective, the hospitals and the network are represented by the project leaders of medication@home for each hospital. Project leaders are important, because they collaborate in the mProve network on medication@home and function as bridges to their own hospitals. These respondents are best to consider the case from an organizational perspective, in contrast to patients or nurses who experience the project at the micro-level or board members who work at the macro-level on overarching long-term strategies. In order to recruit the right sample, a form of non-probability sampling, namely purposive sampling, is used. This means that a selection for the units of observation is made in advance (Van Thiel, 2014). Before interviewing the project leaders, two exploring interviews are held. One with a board member of one of the hospitals and another with the implementation manager of mProve. These interviews are helpful to get a better understanding of the case in general. After the interviews with the seven project leaders, three more respondents are recruited through snowball sampling. With this approach, initially a small group of people who are relevant to the case is sampled and then used to establish contact with others (Bryman, 2016). These three respondents were mentioned by the project leaders, to give additional information on the case. Altogether, the sample consists of thirteen respondents. A disadvantage of a small sample

size is that it affects the generalizability of the research outcomes. Nevertheless, an advantage of a small sample size is that it allows to research the problem in depth. Given that the purpose of this evaluation study is to provide a detailed understanding of the case, having a small sample size is suitable for the research design. All interviews lasted between 45 and 90 minutes. An overview of the final sample is given in table 2.

Nr.	Function	Hospital
1	Board member	Hospital 2
2	Implementation manager mProve	N/A
3	Project leader medication@home	Hospital 1
4	Project member medication@home – head of oncology unit	Hospital 1
5	Project leaders medication@home – outpatient pharmacist and member of team transmural care	Hospital 7
6	Project leader medication@home - clinical pharmacist	Hospital 4
7	Project leader medication@home – project member oncological care center	Hospital 5
8	Project leader medication@home - project leader ICT-innovation department	Hospital 6
9	Project leader medication@home - outpatient pharmacist	Hospital 3
10	Project leader medication@home - program manager hospital@home	Hospital 2
11	Board member	Hospital 7
12	mProve coordinator – secretary medical board	Hospital 5

Table 2: Sample selection

3.3 Operationalisation

This study pays attention to the determinants of innovation and the adoption of innovations at the organizational and network level. In the theory chapter, the concepts are discussed and categorized into dimensions. In figure 2, the dimensions are translated to indicators. These are numbered, to guide the referencing in the results chapter.

The determinants of innovation are categorized for the organizational and network level. For the organizational level, the relevant questions that belong to the MIDI are adjusted for this research context. These questions concern the formal ratification of medication@home (OD1); the presence of one or more persons responsible for coordinating the implementation (OD9); the presence of material, financial and other resources or facilities necessary (OD2 and OD3); the accessibility of information (OD8); the presence of adequate staffing (OD5); the amount of time available (OD7); and the other organizational changes that may occur simultaneously (OD4). One question on organizational learning (OD8) is added, to assess how this is ensured within the organization. Also, three questions on knowledge management are added, to assess the transfer of knowledge on medication@home within the hospital and the use of knowledge from other innovation projects (OD10). For the network level, respondents are asked to explain the structure of the networking, to assess the mode of governance (ND1). Also, they are asked about the goals of the network and the way of cooperation within the network, to explain the network's function (ND4), knowledge management (ND2) and organizational learning (ND3). Respondents at the management or board level are asked about the transaction costs involved to be part of the mProve network (ND5).

The dimensions that belong to the dependent variable, adoption of innovations, include dimensions at the organizational and network level. Respondents are asked about the development of the medication@home innovation within their organization to assess the innovation stage (OA1). They are also asked about the benefits of the network, including resource acquisition (i.e. knowledge gained) (OA4), enhanced legitimacy (OA2), lower costs of services (OA3) and other possible benefits from the network for the organization (OA5). For the network level, respondents are asked to assess the functioning of the network in terms of the value of the network's activities (NA1), the balance between the organization and the network (NA2) and the commitment to the network goals (NA4). Finally, a question is added about the possibilities to improve the network (NA3). The causality of the questions is measured by analysing the perceptions of the respondents and asking the respondents directly about the possible effects of determinants for the adoption of medication@home.

Although the theoretical constructs are discussed in and derived from the theory chapter, it is possible that the respondents also perceive other determinants of innovation or other aspects of the adoption of the innovation that are relevant for this case. Therefore, an open question regarding the determinants that may affect the adoption of medication@home is included. Also, an open question is added regarding the future of the mProve network and the advice the respondent would give to the hospital board. The full topic-list can be found in appendix I. The topic-list is adjusted for interviews with other respondents than project leaders, but the basis of the topic-list remains the same.

<table>
<tr><th></th><th colspan="2">Determinants of innovation ⟷</th><th colspan="2">Adoption of innovations</th></tr>
<tr><td rowspan="3">Network level</td><td>ND1: Structure of the network</td><td>ND2: Knowledge sharing</td><td>NA1: Value of network activities</td><td>NA2: Balancing interests</td></tr>
<tr><td>ND3: Cooperation and learning in the network</td><td>ND4: Function and goals of network</td><td rowspan="2">NA3: Possibilities for improving the network</td><td rowspan="2">NA4: Members' commitment to network goals</td></tr>
<tr><td colspan="2">ND5: Investment costs in the network</td></tr>
<tr><td rowspan="6">Organizational level</td><td>OD1: Formal ratification of medication@home</td><td>OD2: Financial resources available</td><td>OA1: Development of medication@home within hospital</td><td>OA2: Enhanced legitimacy from network towards hospital</td></tr>
<tr><td>OD3: Material resources and facilities available</td><td>OD4: Simultaneously occurring organizational changes</td><td>OA3: Lower costs of services due to networking activities</td><td>OA4: Knowledge gained on medication@home</td></tr>
<tr><td>OD5: Staff capacity to work with medication@home</td><td>OD6: Information accessible on medication@home</td><td colspan="2" rowspan="3">OA5: Other benefits from network for hospital</td></tr>
<tr><td>OD7: Time available</td><td>OD8: Organizational learning</td></tr>
<tr><td>OD9: Presence of a coordinator for implementation</td><td>OD10: Transfer of knowledge</td></tr>
</table>

Figure 2: Indicators of the theoretical dimensions

3.3.1 Validity

Validity is concerned with the integrity of the conclusions that are generated from this research (Bryman, 2016). For this research, content validity is important to consider. Content validity is important for the

operationalization of the concepts used in this study. Content validity questions whether all dimensions are covered. To ensure the quality of this validity, it is important that the theoretical concepts are operationalised correctly. This is done by selecting the most important concepts in the literature review. These concepts have been divided in dimensions and these are in turn translated to indicates. Based on the indicators, the topic-list is constructed. The steps taken in this process are described in the chapters on theory and methodology which enhances the transparency. Moreover, the representativeness is taken into account, because the respondents are well-informed to assess the determinants of innovation and the performance of the project from an organizational perspective.

The aim of this evaluative case study, is not to test a specific hypothesis, but rather to understand this case in-depth. This is ensured by retrieving a representative group of stakeholders that can provide information on both the organizational as well as the network aspects of medication@home. Another threat to the validity of this study is common source bias, which "exists when some of the common variation between two concepts is a function of the common measurement used to gather the data" (Meier & O'Toole, 2012, p.431). This cannot be fully prevented, since not all hospitals are represented by two or more respondents. However, the use of different respondents for the dependent and the independent variables only solves the problem if the source of the bias is the respondents, not the questions (Meier & O'Toole, 2012). Some of the questions regarding the adoption of medication@home might be considered as prone to bias. For instance, asking project leaders about the development of the project so far, may be problematic for common source bias, since the project leaders are generally responsible for the adoption. On the contrary, questions about the determinants of innovation are the least likely to contain a bias, because the respondents assess the organizational system that they are part of. The potential for common source bias is less when the performance question is tightly focused on the dependent variable (Meier & O'Toole, 2012), which is the case in this study.

3.3.2 Reliability

The reliability of a study is concerned with the question of whether the results of a study are repeatable (Bryman, 2016). Reliability depends on the accuracy and the consistency with which the variables are measured (Van Thiel, 2014). The data should be as little as possible be affected by coincidences (Boeije, 2016). In this research, the variables are measured as accurately as possible, because a topic-list is constructed. In this way, it can be guaranteed that every respondent answers the same questions. However, one possible threat to this research method is that respondents answer differently because they are aware of the fact that they are part of a study (Boeije, 2016). For instance, project leaders might have an interest in creating the impression that medication@home functions well in their hospitals. This threat is constrained by paying attention to the confidentiality of participating in this study. Consistency is harder to achieve, because this revolves around the idea of repeatability (Van Thiel, 2014). Since the developments in the implementation of medication@home follow up rapidly, respondents take those experiences into account. For instance, repeating this study in five years will probably lead to other

results, since medication@home might be fully developed already. Although the interview questions offer some leeway for researchers to interpret the answers, consistency can still be achieved in the sense that other researchers are able to interpret the data the same way, using the transcriptions.

3.4 Data collection

Data is collected by means of semi-structured interviews. The data is not retrieved from a secondary source, but collected by the researcher herself, meaning that the data is primary data. In addition, several documents are consulted regarding the structure of the network in general and an evaluation of a pilot with medication@home in hospital 1. The semi-structured interviews use a topic-list, which forms the basis for the interviews, but at the same time gives respondents the opportunity to discuss the topics that they consider to be important. Moreover, this type of interview makes it possible to ask additional questions to follow up on the pre-formulated question for clarification of the answers when needed (Boeije, 2016). The data collection took place at one moment, which makes the research design cross-sectional. Given the current COVID-19 circumstances, all interviews, except for one, are held via online means. Collecting data at one moment in time is the most suitable, because of the time span of this master thesis project.

3.5 Data analysis

After collecting data during the interviews, these are transcribed manually. Every transcript received a random number, so that the anonymity of the respondents is assured. Thereafter, the transcriptions are coded. The process of coding is done in three steps, namely open coding, axial coding and selective coding (Boeije, 2016). For the first step, the indicators will be used as codes. During the process of data collection and open coding, further insights will help to develop the codes for the next steps. Coding is helpful for identifying themes or categories in data that can be assigned with a code (Boeije, 2016). The codebook is attached in appendix II. Also, the data on the network of the project leaders of medication@home has been merged into one Excel-file. These data are processed using UCINET, a software for social network analysis (Borgatti et al., 2002). This software enables to make a network plot, to create an overview of the relations of the stakeholders involved.

3.6 Ethical issues

Since this research involves human participants for both the research methods, the topic-list is sent to the BMS ethics committee in advance. With their approval, the questions can be considered ethically responsible. Moreover, informed consent is applied, which means that the respondents have to express their consent for participating explicitly, after being fully and correctly informed about the content and goal of this research (Bryman, 2016). The respondents participate voluntary and are able to quit whenever they want without consequences. Moreover, the interview participants will get the opportunity to ask questions in advance. Before every interview, the respondent's permission will be asked to record the interview. This recording will only be used for analysing the data in order to get results for this study.

The data that is collected and analysed for this study is treated with confidentiality, which means that names of respondents will not be used when describing the findings of the study. The data is not made available to anyone who is not directly involved in the study and is removed immediately after graduation of the researcher.

4 Results

In this chapter, the results of the study are presented on the basis of the four sub-questions.

4.1 Implementation of medication@home

The first sub-question in this research was formulated as the following: *What variations in the development and implementation of the medication@home innovation do we observe in the hospitals involved in the mProve network?* The development and implementation of medication@home can be understood as the adoption of the innovation at the organizational level (bottom right in the framework). As explained in the theory chapter, this includes the dimensions innovation stage, resource acquisition, lower costs of services and enhanced legitimacy. During the semi-structured interviews, respondents answered questions about the indicators for these dimensions and the following sections describe the main results of each indicator.

- Development of medication@home within the hospital

The indicator for theoretical construct innovations stage is the development of medication@home within the hospital (OA1). The seven hospitals divided the different care paths and medications to be implemented. Some care paths are implemented by more than one hospital. For example, hospital 1 and 6 both implement a medication for the oncology department. Hospital 5 has not chosen a care path yet, because they are part of the network since a few months. The development of medication@home differs per hospital, but also the number of steps to be taken for the implementation of each care path differs. For example, hospital 3 has a chosen to deliver antibiotics at home in a different way, which is an easier and relatively smaller transformation in comparison to delivering oncological medications (e.g. chemotherapy) at home, which is done by hospital 1. Moreover, the care path to be implemented is not the only medication the hospital delivers at home. In most hospitals, several projects are set up to deliver various medications at home.

To elaborate on the development of the medication@home innovation, different stages of the innovation process are discussed and the distinction by Rogers (2003) will be followed. The first is agenda-setting. This stage is completed, because the hospitals joined the mProve network and collaborate on the medication@home project. Still, joining the network is not a guarantee that medication@home is on the internal agenda. All respondents agree that hospital boards feel the need for the shift towards medication at home, but the internal embeddedness is sometimes lacking and there are many more innovative projects on the agenda. So, agenda-setting can be uncertain for project leaders. This attitude is reflected in the following statement:

"And then it comes down to lobbying on our part, to also keep medication@home under the attention at the board level, to promote what we believe in" (Project leader/outpatient pharmacist hospital 7).

The second stage is matching, which is completed because all hospitals except one have chosen a care path to implement. So, a match is made between the local needs within the hospital and the purpose of the mProve network. Third, there is redefining/restructuring. This is an ongoing process, because all hospitals are searching for ways to embed medication@home within their organizational structures and patterns. Most hospitals have not started the pilot for the assigned care path yet. Only hospitals 1 and 6 have started recently. The fourth stage is clarifying. Hospitals 1, 2, 4 and 6 are more or less involved in this stage, because the medication@home project is getting bigger within those organizations. Although this is a next step into the innovation process, it also complicates the implementation when more people are involved. This attitude is reflected in the following statement:

"It is a huge project that involves a lot of things, from many sides, many aspects, within the hospital but also outside. It just takes a long time to get things right and to implement them well, but this is the reality of how it works on such a large project, unfortunately" (Respondent project leader hospital 1).

The fifth and last stage of the innovation process is routinizing, which is not reached yet. Medication@home is not fully incorporated in any of the seven hospitals. One reason is that hospitals are struggling with the question whether routinizing is desirable, because they want to keep the possibility for patients to receive their medication within the hospital and not at home.

- Knowledge gained on medication@home

The indicator for theoretical construct resource acquisition is the knowledge gained on medication@home from the network for the hospital (OA4). The goal of the mProve network is to learn from each other and sharing knowledge is a prerequisite for learning. Respondents indicate that this was quite difficult, especially at the beginning. A lot of time is spent on deciding on the network structure, while network members need hands-on information that they can use in their daily work. In these first months, the emphasis was not much on sharing knowledge, but this has got better throughout the development of the network and more practical matters have been exchanged. Still, it remains difficult, because all hospitals organize medication@home in another way and are not in the same innovation stage. In general, respondents tend to be a bit disappointed in the knowledge gained so far from the network, because the knowledge exchange was not focused on their needs.

One respondent mentions that the network is also a helpful reflection on your own ideas. When an example is shared, other members provide a critical reflection on that by asking questions about what is done by one hospital. While the answers may not be there yet, the questions provide valuable insights as well. Furthermore, two respondents mentioned that the focus of the network should not merely be on sharing best practices, but also on 'bad practices', to learn from each other what is not working.

Besides resource acquisition in terms of knowledge gained, namely having the network is a resource itself. The contacts that come from the network are valuable, not only for the project leaders who are in

the network, but also for other colleagues in the hospitals. It enables sharing knowledge between other departments as well, for instance, medical specialists can be connected from mProve hospitals.

- Lower costs of services due to networking activities

Ideally, networking leads to lower costs of services for the organisation (OA3). Many respondents mention that collaborating within mProve saves time for developing medication@home within their hospital. Although the care paths and ways of organizing differ per hospital, there is always some overlap. For example, when developing a protocol for medication@home, examples from the other hospitals can be used. Moreover, project leaders who work on medication@home are often soloists. For them, it is valuable to exchange knowledge with similar people from other hospitals in an accessible way. This attitude is reflected in the following statement:

"Look, there is no other 'me' within the hospital, and I have no background in health care. Sometimes I think, how do you approach that smartly, because I get stuck here and there. It is very nice to discuss project-based work with others" (Respondent project leader hospital 6).

So, all respondents have a positive attitude towards collaborating within the mProve network, because it makes their own work at the organisational level more efficient.

- Enhanced legitimacy from network towards hospital

Another outcome of the collaboration within mProve is that it may lead to enhanced legitimacy for medication@home at the hospital level (OA2). If one hospital is working with some innovation already, it makes it easier for a project leader to go to a specific department and show the example of the other hospital. Respondents mention that the mProve network is not necessary for innovating within the hospital, but it is a valuable stimulus that helps to inspire and create a movement. However, without mProve, the urge for medication@home would also be there, according to many respondents.

Many respondents mention that it is sometimes difficult to define the relation between mProve and the hospital. The network is established because of an agreement at the board level, but the question is what this means for project leaders and pharmacists at the executive level. This attitude is reflected in the following statement:

"Normally in our hospital, if you want to do a pilot, you have to know beforehand what will happen from A to Z. Now we have started without knowing exactly what this will get us. Does that automatically mean that we have room to freewheel in the pilot?" (Project leader/outpatient pharmacist hospital 7).

Some respondents wait for more guidance from the mProve network towards their hospital. For example, they would prefer to have mProve create explanation on the purpose of medication@home. Since the pilot is open-ended, project leaders are now confronted with many questions from their colleagues and sometimes feel like they have to activate people, while that may be solved by giving mProve a more

prominent role. Some respondents are struggling to find their role as linking pin between mProve and the hospital and wonder whether they are mandated to set up medication@home within their own hospital. For instance, respondents from hospitals 6 and 7 experience that they have to negotiate with internal departments about practical issues, such as finances. When the relationship between the network and the organisation is more clearly defined, this would prevent delay from those internal negotiations and this could improve the implementation of the innovation.

- Conclusion sub-question 1

On the basis of assessment of the indicators above, the first conclusions about the variations in the development and implementation of the medication@home innovation in the hospitals can be drawn. The hospitals differ in the developmental stage of medication@home and this depends on the duration of their mProve membership and the type of medication that is implemented. For instance, hospital 3 is part of mProve since its conception and implements a relatively easy medication. Therefore, they are in a more developed innovation stage than hospital 5, who has just become a member, or than hospital 2, who is dealing with more complex medication. Also, at the hospitals where medication@home is less far developed, they gain more knowledge from the network for their organization, since they can learn from the more developed hospitals in the network. The hospitals where medication@home is further developed benefit from the network for a critical reflection on their strategies. For the indicator lower costs of services, no variation among the hospitals is observed. All project leaders have a rather individual function within their organization and benefit from knowledge exchange in the network. Last, the mProve network is differently estimated in the hospitals, which leads to differences in enhanced legitimacy from the network for implementation of medication@home. To conclude, it is difficult to assess the development and implementation of medication@home in the various hospitals, because the stages are not so strictly separated than was expected from the theory.

4.2 Determinants of innovation at hospital level

The second sub-question in this research was formulated as the following: *What determinants underlie the successful implementation of the medication@home innovation in the different hospitals?* The various determinants that arise from the theory chapter are summarized in the bottom left of the framework. During the semi-structured interviews, respondents answered questions about the dimensions. The following section describes the main results of each dimension in order of importance.

- Formal ratification of medication@home

The formal ratification of medication@home is considered by all respondents as the most important determinant for the implementation within the hospital (OD1). It is necessary for a successful implementation. For instance, it can be part of an annual plan or vision paper. Medication@home has been formally ratified to different extents in different hospitals. In hospitals 4 and 7, medication@home started as part of the pharmacy, and now the step to embedding within the entire hospital has to be made.

Some respondents mention that it is a long-winded issue and a matter of taking others with you in the beginning of the process. However, formal ratification is just a beginning. A next step is to formulate goals for medication@home. These are often not clear, except for hospital 1, because it is difficult to determine beforehand where the pilot will lead to. Also, the goals depend on the way of funding. Hospital 3 has the goal to create a functional way for medication@home within the first year. Hospital 4 has the goal to start with six patients in the pilot. All respondents mention that patient satisfaction is the most important goal.

Another aspect of formal ratification is the establishment of a project team within the hospital. It differs per hospital how this is organized, varying from having merely two project leaders (hospitals 5 and 7), to a whole organizational network on medication@home (hospitals 1, 2 and 6). According to the experiences of the project leaders, it is helpful when a project team is set up and meets regularly to keep the innovation going. Many respondents mention that it is important that project leaders are preferably not medical specialists or pharmacists, because they are often not used to writing a project plan. An important stakeholder is the ICT. They should be contacted at an early stage to think with the pilot, which is already done by all hospitals except 3 and 5. This is important because medication@home is not considered a temporary pilot, but the future of healthcare, as is reflected in the following statement.

"It is not just a project, it is a whole movement I would say" (Respondent project leader hospital 2).

However, because it is not considered just a project, but a whole movement, formal ratification is more difficult. Therefore, it is even better to embed the innovation into a hospital-broad program. All hospitals are working on the transition towards delivering care at home and establish many projects on this transition. For example, hospitals 1, 2 and 4 have a hospital@home project, where medication@home is part of. In hospitals 3 and 7, this embeddedness is lacking and this hinders alignment with other programs. An organisation-wide approach is necessary for further development and upscaling of medication@home. For most hospitals, it is work in progress to further develop hospital@home programmes where different initiatives are brought together. An advantage of this embeddedness is the possibility to organise practical matters together, like ICT. Medication@home moves beyond the traditional structures of the hospital, because it includes medical, pharmaceutical, technological and financial components. It can be difficult to collaborate with all different units, because all have their own interests. This need for organisation-wide collaboration and support is reflected in the following statement:

"You do need a multidisciplinary team to go for it together, if you miss someone from that group, I think you will run into a wall very quickly" (Respondent project leader hospital 1).

Last but not least, support from administrative levels is important for the formal ratification of the innovation. This has an impact on the freedom for project leaders to work on medication@home. Hospitals 1 and 6 are supported to a large extent. For instance in hospital 1, the board has given

permission to set up a pilot to deliver medication@home with not-oncology nurses, by setting up an education module. This is against the national standards, but the board is very open to new innovations and developments. At the same time, respondents 5 and 7 have the feeling that there are so many interesting innovations, that they have to promote it continuously. Support from administrative levels is important, because it helps project leaders, which makes it also more fun to do. According to respondent 12, this has a positive effect on the implementation of the innovation. When the innovation is formally ratified, project leaders have the possibility to use this to obtain financial resources and to link the goals of medication@home to this formalization, which in turn can lead to the creation of hours designated for this purpose. Respondents 5, 7 and 8 mention the need for support, which is reflected in the following statement:

"Everything stands or falls with that policy statement: yes, we are going to work on this" (Respondent project leader hospital 5).

So, medication@home is formally ratified to different extents in the different hospitals and this affects the implementation of the innovation.

- Financial and material resources and facilities available

Following up on formal ratification, there is need for different types of resources for the implementation of medication@home, namely financial resources (OD2) and material resources and facilities (OD3). By many respondents, financial resources are considered to be the biggest challenge for the implementation of medication@home. The problem is the business case. It is difficult to determine in advance how much costs are saved by delivering medication at home and the investment costs are rather high. A movement towards more care at home has started, but the destination is unknown. In some hospitals, transition funds are available to carry out the pilot, while in other hospitals it is difficult to start the pilot because a business case is lacking.

While it is already difficult to arrange the costs for the new organisation of health care delivery within the hospital, the collaboration with external parties makes it even more complex, due to the different financing flows. For instance, when medications at home are provided by a home care organisation, it is no longer hospital care. Especially for medical specialists, this is dangerous, because if they lose their care, they do not earn on that. Some project leaders mention this to be a barrier for the implementation, while other project leaders experience a positive attitude from medical specialist. Health insurers play an important role in this, but the current financial healthcare system is not made up to cover the costs for providing health care at home. Moreover, none of the project leaders has direct contact with health insurers. Respondents are pessimistic about a solution at short notice, because the whole system needs to be reviewed. This attitude is reflected in the following statement:

"Conversations with the health insurers are going on, but well, I don't have very much confidence that we will receive funds. Because we have to prove that it can be cheaper in so many years, and that is impossible" (Respondent project leader medication@home hospital 2).

Financing health care is a nationwide topic. Respondent 10 mentions that the government and health insurers ask for the movement towards care at home, because hospital care is expensive, but we are stuck in a financial structure, where no one knows exactly how this movement can fit in the current system. For the short-term project, transition funds are often available. The question is how the broader movement be funded on the long-term. Because of this uncertainty, medication@home is put on-hold in hospitals 5 and 7, while hospitals 1, 2 and 6 can just start. Respondent 12 mentions that innovation are often perceived at microlevel, but this should be on macrolevel, to consider the societal costs and benefits. Unfortunately, the Dutch healthcare system is not shaped that way.

Second, material resources and facilities are needed. Most important resource mentioned by many respondents is ICT. The digital infrastructure needs to be in place in order to effectively collaborate, with external organisations as well. Furthermore, an adequate planning system, accessibility for different parties and safe storage of patient data are mentioned as important aspects of the ICT resource. All hospitals are in different stages of developing the digital infrastructure and some work with different systems. Therefore, more knowledge and best practices on this topic should be exchanged.

- Time available

Another important resource for staff to implement medication@home is time available (OD7). For the organization of the project, FTE are available. In practice this means that often only the project leader of mProve has hours designated for this project. Medical specialists and other departments that are involved in the project team have created time between other tasks. Respondent 3 mentions that a result is that not everyone is always at the meetings, which causes delay in decision-making. The goal of hospital 6 is to ultimately be able to pay the medical specialist needed for an innovation project, because they are important for the development, but lack time to intensively cooperate. In hospitals 3 and 4, even the project leader has no extra hours for medication@home, probably because the innovation is invested at the pharmacy instead of the hospital itself. This attitude is reflected in the following statement:

"Time is made available in that sense that it is now organized and classified and so on. But no time is made for me, so I just work an hour longer" (Respondent project leader clinical pharmacist hospital 4).

- Information accessible on medication@home

Many respondents mention that it is important that the users know where to find information on the use of medication@home (OD6). It is core business for project leaders, but medical specialists have many other tasks and medication@home is just a small part. Therefore, attention needs to be paid to accessible information. Although project leaders aim for this, it remains a challenge to make information available

and findable. This is not only a project leaders' task, but attention for medication@home throughout the entire hospital is important. In order to do so, hospitals 4, 5 and 7 have appointed an mProve coordinator, who is the linking pin between the board and the rest of the hospital. The mProve coordinator is responsible for all projects, not only medication@home. Having a this coordinator helps to increase the support for medication@home and to transfer information throughout the entire hospital. Respondent 12, an mProve coordinator, mentions that it is important that the board gives regular updates on mProve to the rest of the hospital. Providing information is important, but respondents 8 and 12 warn that medication@home should not be promoted too much, because that may lead to many project requests, which cannot all be honoured.

- Presence of a coordinator for implementation

Besides the importance of having a project team within the hospital, which is described under formal ratification, the presence of a coordinator for implementation is important (OD9). For all hospitals, this is the project leader who is involved in the mProve network as well. The project leader or coordinator is occupied with bringing stakeholders together and arranging practical issues, as mentioned before. The presence of a coordinator who is passionate about medication@home is also favourable to motivate others within the hospital. All hospitals have a project leader, but it differs whether this person has time available to carry out medication@home or is enabled with financial resources to go ahead with the pilot and this affects the implementation of the innovation.

- Transfer of knowledge

The indicator for theoretical construct knowledge management is the development of medication@home within the hospital (OD10). One task of the coordinator, i.e. project leader, of medication@home is to manage the knowledge on the innovation. Managing and sharing knowledge on medication@home is not always secured in formal activities. Sometimes project leaders just know who they need for something and stakeholders can inform each other easily. Short lines of communication are beneficial for the implementation of medication@home. Most project leaders do not have a direct link with the board level, but the management level can give consent on decisions to be made. The appointment of an mProve coordinator as a linking pin between the board level and executive level is also very helpful for knowledge sharing, which is ensured within hospitals 4, 5 and 7. This attitude on the benefit of short lines of communication is reflected in the following statement:

"The transmural team, we have a very good relationship with them. They are just a few doors down here in the same building. So you can just walk over there and ask what's going on" (Respondent project leader outpatient pharmacist hospital 3).

However, the risk of this form of cooperation is that knowledge sharing is limited to the corridors. Hospital 3 experienced this with the broader hospital@home programme. There used to be a connection,

but because of staff changes, there is no direct link anymore with medication@home. The project leader of this hospital acknowledges that now the connection is gone, things are a little less easy and they have to work on that. Therefore, formal ratification is an important prerequisite for knowledge management.

Some respondents mention the wish for some kind of organizational entity where all experiences with hospital care at home are combined. Medication@home started as a pharmaceutical project, but in order to scale it up, other hospital departments and units are needed. Hospital 1 wants to have broader publicity for medication@home throughout the hospital, but they are still searching for a way to organize that. In hospital 2, setting up this entity is a work in progress. In hospital 3 and 4, medication@home is still solely invested with the pharmacy. The impression is that there is still a gap between the pharmacy and the hospital, as an example of the traditional structures described before. This attitude is reflected in the following statement:

"Ten years ago, we initiated it already, and we've had so many discussions, but we didn't get the colleagues in the hospital with us" (Respondent project leader clinical pharmacist hospital 4).

- Organizational learning

Learning within the organization (OD8) depends on the access of information and knowledge management. Also, by embedding an innovation within formal structures that include several organizational components, learning can be enhanced. For instance, information is exchanged during project team meetings. It differs per hospital how this is organized. Hospitals 3 and 5 do not have a formal meeting structure for medication@home, since the project is relatively small. In hospital 7, the project team meets every three weeks, while in hospital 6, weekly meetings of 15 minutes take place.

Some respondents mention that it is difficult to learn from different departments within a hospital. This is due to the traditional structures with the dichotomy between line management and medical staff, who both have their own plans and have to be brought together. These different departments have to collaborate more and more, but the structure and management layer are not ready for that, yet. Respondent 12 calls this 'a classical machine bureaucracy'. By way of contrast, project leaders and hospitals are searching for new ways to govern organizational learning. For example, in hospital 7, four times a year, so-called 'connection-meetings' are organized for all members of mProve project teams, in order to stay informed on all mProve projects within the hospital. In that sense, learning from other projects is enabled.

- Staff capacity to work with medication@home

Staff capacity (OD5) is about the presence of adequate staffing that has to use an innovation. According to all respondents, this capacity is not a barrier for the implementation of medication@home, but the information access and time available are more important. Everyone can work with medication@home, but it is more about organisational barriers and gathering the right people to get the innovation going.

Respondent 6 believes that medical specialists are often not involved in policy making, while it is very important that their expertise is represented. Therefore strong ties are considered as part of staff capacity. When staff can easily reach out to each other about the medication@home innovation, this is beneficial for the project, according to many respondents. Also, assigning a project leader is important, who can arrange practical issues, such as writing a project plan and having contact with stakeholders, to make it as easy as possible for staff. This is done for every hospital, but it differs how much time they have available.

Another aspect of staff capacity is support for the innovation by the (medical) departments that have to work with the innovation. Many project leaders mention that it is important to be aware of what is going on there and respond to their needs to create enthusiasm for medication@home. In hospitals 1, 3 and 6 nurses are enthusiastic for the change, because it saves time for them to help more complex patients, which makes their job more challenging. However, in hospital 5, the innovation goes along with worrying among nurses, who fear the future of their job when home care organisations are taking over. Medical departments are often focused on their internal processes and such a change may seem far away. Therefore, it is important that project leaders actively get in touch with staff and explain about medication@home. This attitude is reflected in the following statement:

"You are very dependent on the necessity that specialists also see that this is a development; and you see that it also has a lot to do with a cultural and behavioural change" (Respondent project leader hospital 7).

Many respondents mention that the support among medical departments has increased by providing examples of projects that have been carried out by other hospitals. The mProve network is therefore useful, to share knowledge on experiences with medication@home.

- Simultaneously occurring organizational changes

The indicator for theoretical construct organizational turbulence is simultaneously occurring organizational changes (OD4). On the one hand, this has a negative impact on the implementation of medication@home. At the moment, hospitals are occupied with postponed care due to COVID-19. Also, the start of medication@home can be dependent on other organizational changes, such as the implementation of telemonitoring. This can cause delay for the implementation. Moreover, respondents 5 and 6 mention that there are about 300 other innovation initiatives within a hospital, that all ask for attention. So, decisions have to be made about which projects are carried out and which not, which can be a difficult task. The preference is to carry out a few projects from A to Z. This attitude is reflected in the following statement:

"Everyone wants to bring their thing forward, but we can't do everything" (Respondent project leader pharmacist hospital 7).

On the other hand, some respondents indicate that organizational turbulence can also be a stimulus for innovation. For instance, due to COVID-19, digitalisation within hospitals has accelerated. Patients are more used to video-consultation than before. Most respondents are not afraid that medication@home will not survive in the jungle of many innovation projects, because it fits within the overarching hospital strategy of transferring hospital care. Furthermore, different initiatives can help each other. For example, the establishment of a monitoring centre is necessary for medication@home, but for one innovation it is not viable. When several initiatives need such a centre, it is more likely that this is organized.

- Conclusion sub-question 2

On the basis of the assessment of the indicators above, conclusions can be drawn on the determinants that underlie the successful implementation of medication@home in the different hospitals. From the theory, ten determinants were derived. In practice, all have an impact on the implementation, but some are more important than others. Formal ratification is the most important determinant of innovation for the organizational level and the other determinants are subordinate to this one. Hospitals differ to what extent the medication@home innovation is formally ratified, for example in terms of the establishment of a project team; the embeddedness of medication@home within other hospital programmes; or the support from administrative levels for the innovation. The differences in formal ratification have implications for other determinants as well. For instance, if there is support from the board for medication@home, it is more likely that financial resources are made available to carry out the project (hospitals 1, 2 and 6). This is different for hospital 4, where medication@home is merely part of the pharmacy, but not formally ratified within the entire hospitals. This leads to a lack of time available to carry out the project and to activate staff for the innovation. Another important resource is the readiness of the ICT infrastructure and hospitals vary in the extent to which this has been developed. A last conclusion that is remarkable for the determinants of innovation at the organizational level, is that the transfer of knowledge is an important factor, but great differences exist in the ways this is ensured within the hospitals. When a formal project team is established that is supported by the board, transferring knowledge and learning from different departments are facilitated. On the contrary, in some hospitals, collaboration between medical staff and line management is difficult, which is a barrier for the implementation of medication@home.

4.3 Organization of the network

The third sub-question in this research was formulated as the following: *How is the mProve network organized around the medication@home innovation?* In order to answer this sub-question, an overview of the network is provided based on descriptions of the network from the perspective of the project leaders. Moreover, the determinants of innovation at the network level are assessed here (top left of the framework). The following section describes the main results of each dimensions involved here.

- Structure of the network

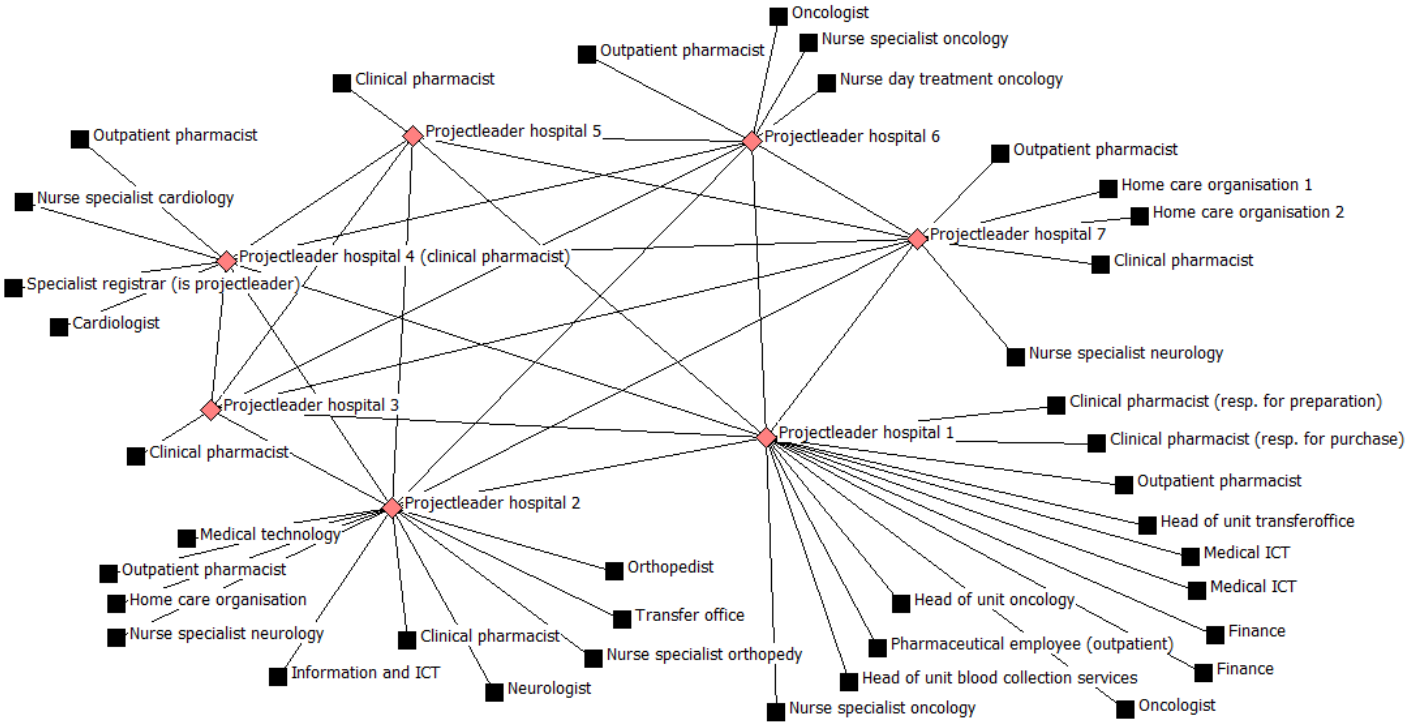

Figure 3: Overview of structural connections for medication@home within the hospitals

In figure 3, an overview of network from the perspective of the project leaders is provided on the basis of an analysis with UCINET (Borgatti et al., 2002). The project leaders are marked with a pink diamond; the other stakeholders with a black square. This overview contains the connections where project leaders have structural contact with concerning medication@home. Of course, all project leaders are connected with each other, because they regularly meet in the mProve network. The figure shows that project leaders of hospitals 1 and 2 have by far the most connections within their hospital. As described before, having contact with an organisation-wide group of stakeholders on a regular basis is beneficial for the implementation of medication@home. The figure also shows that hospitals 3 and 5 have structural contacts only with the pharmacy, since medication@home started as a pharmaceutical project.

Besides the structural connections, the project leaders' incidental connections that can be contacted upon request are mapped. This is visualised in figure 4 and complements figure 3. For hospital 1, 2 and 4, the link of medication@home with the hospital board becomes visible. In all three hospitals, this is an indirect link from the project leader via a management level or steering group. Moreover, it can be seen that project leader of hospital 6 has many more incidental connections for medication@home than structural connections. However, for hospital 3, medication@home is limited to a project within the pharmacy only, for both the structural and incidental connections. For hospital 1, the opposite applies, because this project leader has many structural connections, but is also more active in the incidental network. So, it may be that there exists a correlation between the type of medication provided and the number of both structural and incidental connections of the project leader within the hospital.

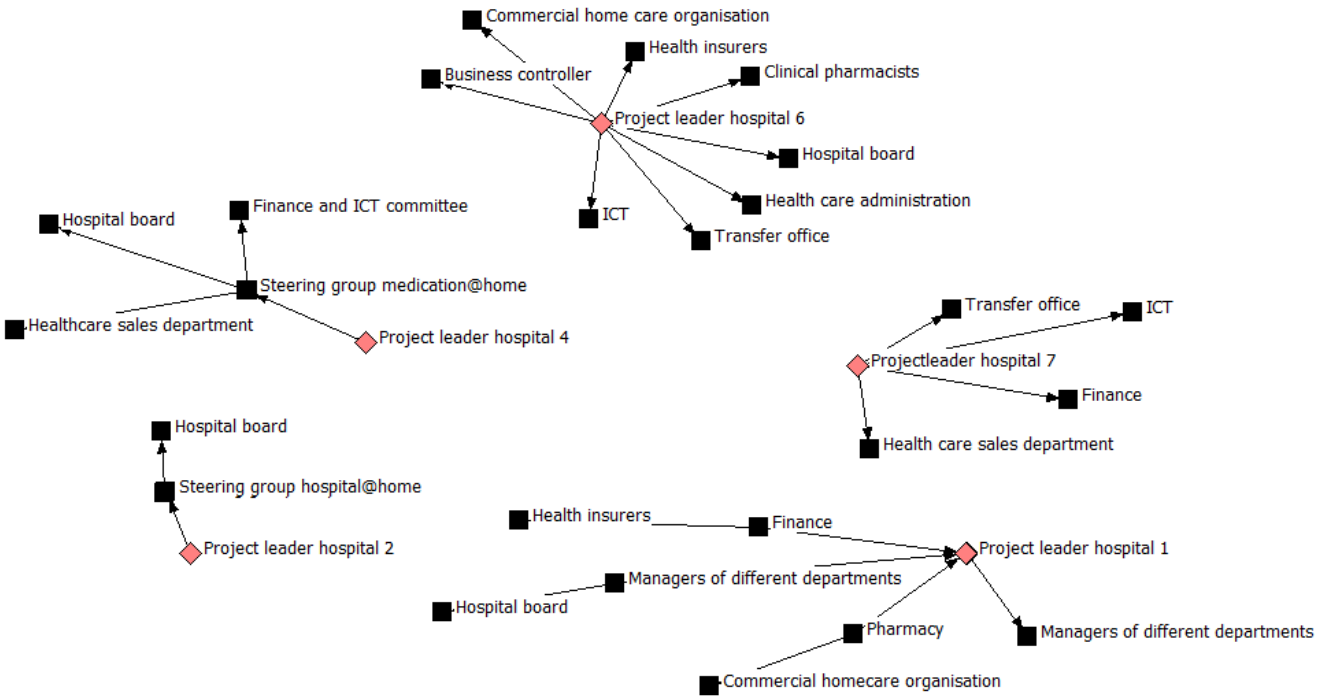

Figure 4: Overview of incidental connections for medication@home within the hospitals

Although this overview provides some insights into the network around medication@home from the project leaders perspective, it is far from complete. Project leaders mention that they have external contacts about medication@home related topics with other hospitals than mProve hospitals as well, for example when they meet others at national conferences. Also, respondents mention that medical specialists and pharmacists have their own connections throughout the country and abroad, for example, from their student days. This is also a valuable source of information for medical specialist and pharmacists. Moreover, besides the mProve network, all hospitals are involved in other networks as well. For instance, hospital 1 is involved in a lung cancer network with six other hospitals in their region. Project leaders who are responsible for medication@home do not have a view on all connections of the hospital and individual employees. Therefore, this overview of the network is not complete, but it gives an indication of the types of stakeholders that project leaders have contact with. Furthermore, it reveals differences in the embedding of medication@home within the hospitals, because of the differences in network size within the hospital. For instance, in hospital 5, medication@home has just started, while hospital 1 has achieved a large group of stakeholders already.

Based on the structure of the network (ND1) and the experiences of respondents, the mProve network can be considered a form of shared participant governance. Here, the network is governed completely by the organizations within the network. This is possible, because of the low number of network members, i.e. seven hospitals. This form of network governance demands participation of members and creates a high rate of involvement, which is ensured through the meetings organized to keep all members involved. However, a risk of this form is that decision making tends to go slow, due to the lack of a

steering and deciding actor. The mProve network solved this issue, by assigning a chair who is in the lead of the project. This is someone who originally works at hospital 2, but is not involved in the medication@home project within that hospital. Moreover, hospital 2 is not hierarchically superior to the other hospitals. Therefore, the mProve network for medication@home is a form of shared participant governance, with the presence of a network broker, who fosters commitment and mutual understanding by chairing network activities.

- Function and goals of the network

The function of the network correlates with the goals of the network (ND4). Almost all respondents explicitly mention learning from each other as the most important goal of the network. The mProve network is a typical form of an information diffusion network, but it has more goals. Another goal is to collaboratively develop the most optimal form to administer medication at home. Respondents mention that it is difficult to reach this goal, because of differences within the hospitals. Each project leader is committed to hospital-specific goals as well. A final goal that is mentioned by several respondents is to manifest medication@home nationwide. The network functions as a platform to stand strong together and enables hospitals to make themselves heard by other parties, such as health insurers. So, respondents agree on the goals for the mProve network.

- Cooperation and learning in the network

The indicator for the theoretical construct organizational learning is cooperation and learning in the network (ND3). Learning from each other has been mentioned as the most important goal of the mProve network. However, many respondents indicate that they are a bit disappointed about the revenues of the network in terms of learning. A lot of time is spent on deciding on the network structure, while network members need hands-on information that they can use in their daily work. Until now, there were not many points to take back to the hospital. Respondents 7 and 8 mention that sharing knowledge and responding to requests for help is not common in the hospital world, but it is very important. They suggest that more time should be taken to assess the different requests for help, so that the network can help to find answers. The lack of time to share what each hospital is doing and where the needs are is reflected in the following statement:

"We will start the pilot on November 1, but I have actually no idea, when that is in the other hospitals" (Respondent project leader hospital 7).

Learning at the network level is complicated, because every hospital has its own manners and ways to organise medication@home. Moreover, all projects are different and therefore it is not just a matter of 'copying and pasting' what works best. For instance, one hospital prefers to work with a home care organization, while another uses hospital nurses for medication@home. There is no right or wrong. Thus, members are still searching for ways to get the most out of the network and foster learning.

Besides learning within the formal structures of the network, organizational learning takes place in informal ways. For instance, hospitals 1, 2 and 6 have had three meetings with each other to exchange knowledge on more practical issues. Furthermore, several respondents indicate that they can call other project leaders easily in case of a quick question. That is a valuable revenue of the network in terms of organizational learning, but it is questionable whether the formal network meetings should pay attention to these needs, so that these are more useful for the members as well.

- Knowledge sharing

Knowledge sharing (ND2) is assured by strong ties and the presence of a knowledge broker. Respondents feel like the ties are strong, because the group is relatively small and everyone deals with the same issues. However, respondent 9 mentions that the group should not become bigger, because it is already difficult sometimes to remember what everyone is doing. Also, knowledge sharing is affected by the composition of the network. The members consist of both pharmacists and project leaders. Both have a different perspective on medication@home. Respondent 10 mentions that these differences are valuable, because it is interesting to learn from different perspectives. On the contrary, some other respondents indicate that it is a barrier sometimes, which is reflected in the following statement:

"They are focused on the content, so they know every detail, which I don't understand. That gets mixed up" (Respondent project leader hospital 6).

Strong ties will be fostered further with the establishment of four expert groups. The project leaders of the hospitals are divided over these groups and each group deals with another topic. The topics are KPI's; make or buy; translocation; and ICT. Respondents have positive expectations of these expert groups. They predict that it helps to tackle issues that they face in their daily practice.

The presence of a knowledge broker is secured, because this has been the same person since the establishment of the network. Although project leaders are a bit disappointed about the revenues of the network so far in terms of learning, they are positive about the leader and admit that it is a tough project.

- Investment costs in the network

The indicator for the theoretical construct transaction costs is the investment costs in the network (ND5). A financial contribution has to be made, but the most important transaction costs is time of staff to work on the projects. Most project leaders have hours designated for this purpose, but not all do and project leaders notice differences in how well prepared people attend network meetings. Moreover, medical specialists have to commit themselves to the projects, otherwise the innovation cannot succeed within the organisation. So, having a network is one thing, but the board of the hospital is responsible for making the organisation ready to be active in the network, which is not done for all hospitals.

- Conclusion sub-question 3

From the assessment of the indicators on the organization of the network organized around the medication@home innovation, the conclusion for the third sub-question can be drawn. The amount of structural and incidental connections of the project leaders differ per hospital, but this does not necessarily have an impact on the implementation of the innovation. It can be concluded that the mProve network around the medication@home innovation is organized as a shared participant form of governance. The main function and goal of the network is to foster organizational learning. From the theory, learning is considered to be an important determinant, but in practice it turns out to be difficult to organize learning within the formal network structures. Therefore, network members contact each other for information besides the formal meetings, during informal contacts. Strong ties are present and will be further developed in the expert groups, which is beneficial for knowledge management. However, ultimately, whether the network is profitable depends on the organizational readiness to participate in the network. It differs per hospital how much time and resources are invested to set up the medication@home innovation within the hospital, and this has consequences for the development.

4.4 Network performance

The fourth sub-question in this research was formulated as the following: *To what extent is the network helpful for the adoption of innovations?* To answer this sub-question, the perceptions of the project leaders on the networking activities are analysed (top right of the framework). The following section describes the main results of each dimension involved here.

- Value of network activities

The indicator for theoretical construct network legitimacy is the value of network activities (NA1). A network is considered to be helpful for the adoption of innovations when internal legitimacy is achieved. This means the network is positively estimated by its members, especially whether they perceive an added value of the network. Although there are differences among hospitals, for example, in the type of medication and the internal organization, the hospitals use the mProve network to learn from others. Many respondents indicate that this is valuable, and despite the differences, much can be learned. A first, specific revenue of the network, is sharing the organizational structures for medication@home and discuss what works under which conditions. Moreover, simply having access to a network is an added value in itself, because it increases the contacts for a hospital to share practices with. Many respondents mention that they expect the network to have a greater impact on national level. For instance, in making the hospitals heard by other parties. However, this added value is not achieved yet, but is an expectation for the future.

- Members' commitment to network goals

Another way to measure internal legitimacy, is the the extent to which there is commitment to the network goals (NA4). As described under the function of the network, respondents agree on the goals for the mProve network, of which learning from each other is the most important. However, some respondents indicate that these goals on the higher level are formulated quite vague. When translating these goals to the executive level of the project leaders, it is sometimes difficult to decide what is done within the mProve network; and what is done by each separate hospital. The commitment to the network goals differs per hospital. Although all respondents mention there is agreement on the goals, project leaders have to deal with the internal hospital environment. This impacts the commitment to the network goals. For instance, project leaders from hospitals 1, 2 and 6 are pushed by their hospital to make medication@home work. On the contrary, the project leader from hospital 5 is inhibited by its hospital to implement medication@home, and can therefore not fully contribute to the mProve network.

- Balancing interests

The indicator for theoretical construct network climate is balancing the accomplishment of organizational interests and the willingness to go beyond these interests in the network (NA2). The network's interest is to share information. Traditionally, competitive thinking dominates the hospital sector. Within the mProve network, this barrier is removed, because the hospitals are spread out over the country and serve a different region. Although information can be sensitive, many respondents indicate that the lines of communication are short and network members share information easily. However, accomplishing a balance with the organization's interests can be difficult, since project leaders indicated that it is difficult to define the relation between the network and the hospital.

- Possibilities for improving the network

The theoretical construct network's activating capacity is indicated by the possibilities for improving the network (NA3), because it is about the ability to keep the network going. For this aspect, network relationships within the network are more important than its effectiveness. Especially in this development phase of the mProve network, major successes in terms of effectiveness should not be expected. Respondents indicate that there are strong ties within the mProve network and that network members are approachable. This positive attitude towards the ambiance of the network has its downside. Without obligations for the hospitals towards the network, there is no formal mechanism to control the network members. However, the network has formulated goals on the board level, which enhances the chance for the network to be sustainable on the long-term. As possibility for improving the network, respondents mention that the network should focus on the member's needs.

- Conclusion sub-question 4

From the assessment of the indicators on the perceptions of the project leaders on networking activities, it can be concluded that the mProve network can be helpful for the adoption of innovations. However, it takes time for the network to develop in order to indicate specific revenues and advantages. So far, network members have a positive attitude towards the network, but they hope and expect to get more out of it. Also, there is commitment to the network goals, but due to uncertainties about the relation between the network and the hospitals, it is difficult for some project leaders how they can optimally use the network. Given this, it is also affects the balance between the organizational and networks' interests. So, network performance is work in progress, relationships need to be defined more clearly and the network should focus on the needs of the members.

5 Conclusion and discussion

In this chapter, an answer is given to the main research question *What determinants of innovation in the mProve network promote the adoption of medication@home in the associated hospitals?*. In order to answer this research question, four sub-questions were posed to guide the research. Twelve interviews are conducted to collect the data. Answers to the sub-questions are described in the previous chapter.

- Determinants of innovation

The determinants of innovation are considered for both the organizational and the network level. The former includes formal ratification; financial resources; material resources and facilities; organizational turbulence; staff capacity; information accessible; time available; organizational learning; presence of a coordinator; and knowledge management. The latter includes mode of network governance; knowledge management; organizational learning; function of the network; and transaction costs. From the theories, it was expected that all determinants are strictly separated. However, in practice it turns out that determinants can overlap. For instance, the presence of a coordinator can be considered as part of formal ratification, while these are separated in the the Measurement Instrument for Determinants of Innovation (MIDI) (Fleuren et al., 2014a). Moreover, some topics mentioned by respondents are difficult to assign to one determinant. For example, the determinants knowledge management and organizational learning are strongly interrelated. Sometimes it was difficult to make the distinction between determinants clear, so it can be concluded that overlap exists between the determinants.

On the basis of the theoretical discussion, it was also expected that all determinants of innovation are equally important. However, it turns out that the determinants have different weights in practice. For instance, almost all respondents mentioned that the success of the innovation falls or stands with the formal ratification of the project. From this formal ratification, other determinants that are also important can be derived. While existing scientific literature poses all determinants of innovation at organizational level next to one another, based on the results of this study, a new theoretical framework can be suggested, which is presented in figure 5a. To clarify this framework, the hierarchical order of the determinants of innovation at the organizational level are visualized in figure 5b. Here, formal ratification is considered as a starting point for all other determinants, except organizational turbulence which is treated as a separate determinant, because it deals with other processes within the organization.

For the network level, organizational learning and knowledge management are the most important determinants of innovation, since sharing knowledge and learning from other hospitals are mentioned by all respondents as the most prominent goals of the mProve network. Until now, network members tended to be a bit disappointed in the effect of these determinants on the adoption of the innovation within their hospital, because the network was not much focused on sharing hands-on information that can be used by project leaders. Although learning is considered to be an important determinant from the theory, it turns out to be difficult to organize this in practice. Nevertheless, all respondents are optimistic

about the future of the network, because a new structure is applied from September 2021. For the success of organizational learning and knowledge management, these determinants should be tuned to the mode of network governance and the function of the network. Since information sharing in an accessible way is the main function of the network, explicit attention needs to be paid to the design of organizational learning and knowledge management in practice. So far, that is done inadequately within the network, because network members contact each other outside the formal network meetings to gather the knowledge they need.

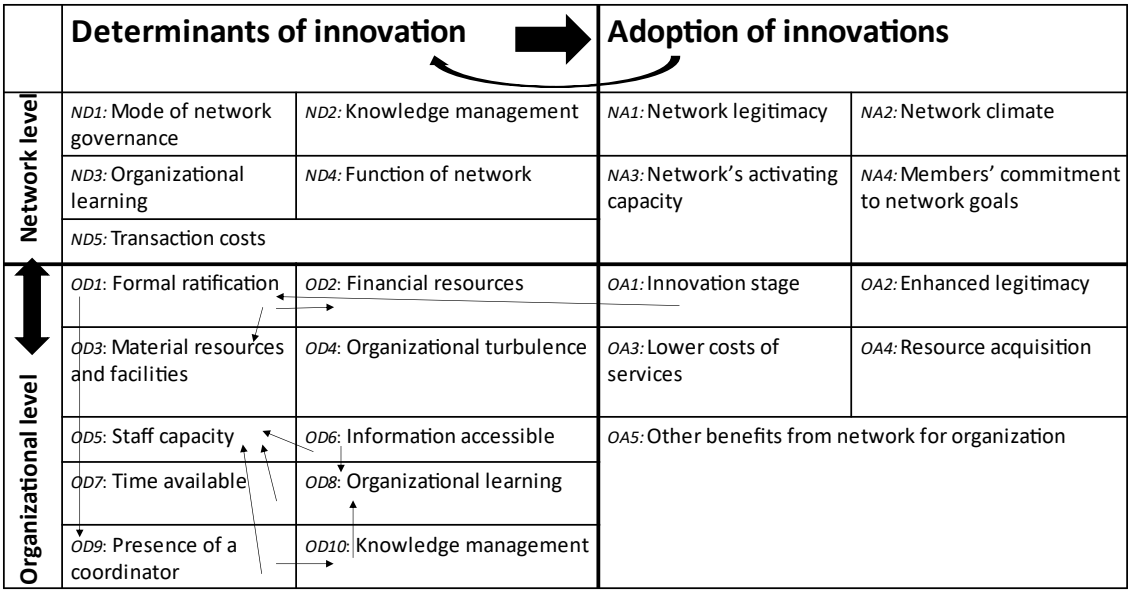

Figure 5a: Suggestion for a new theoretical framework

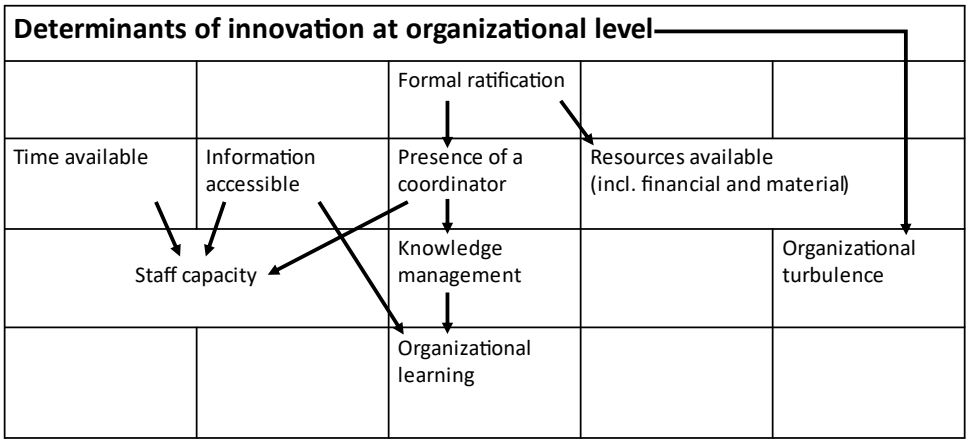

Figure 5b: Determinants of innovation at organizational level in relation to one another

- Adoption of innovations

The adoption of innovations has been considered at both organizational level and network level. From the results, it can be observed that some hospitals are more advanced in the adoption of medication@home than others. For instance, only hospitals 1 and 6 have started with the pilot of the assigned medication. Other hospitals are making preparations for the start of the pilot, which includes gathering the right people and defining the way of organization. These differences are mainly due to

differences in the type of medication administered and the extent to which medication@home is formally ratified within the hospital. On the contrary, the innovation stage affects the formal ratification of the project, because a further developed innovation is more likely to be formally ratified and further embedded within the organization (fig. 5a). Moreover, it can be concluded that support from the board for medication@home is necessary for the project leader to be equipped with time and resources available to carry out the project, as is the case in hospitals 1, 2 and 6, but less in the other hospitals.

The discrepancy between theory and practice does not only apply for the determinants of innovation, but also for the characteristics of the adoption of innovations. Most important here is the attempt by Rogers' (2003) theory on the adoption of innovations to divide the innovation process in five stages. It turns out in practice, that innovating is not a linear process. For instance, only two hospitals undertake activities that officially belong to the third stage, while more hospitals are already involved in the fourth stage. So, the innovation stages are not so strictly separated as theory suggested and stages may overlap.

For the network level, it can be concluded that the recent establishment of the network has implications for its development. Network members indicated that the network has the possibility to grow further, in order to be helpful for the adoption of innovations. Most important, the relationship between the mProve network and the associated hospitals is not defined clearly for all hospitals yet, which complicates the role of the project leader who represents the hospital in the network. Moreover, the network should pay attention to the needs of the members, in order to be positively evaluated and to have an added value.

In the theoretical framework, an extra arrow was drawn from the adoption of innovations towards the determinants of innovation, to indicate that a higher (perceived) adoption of medication@home affects the presence of determinants of innovation. This assumption is confirmed for this study, because medication@home is further adopted within hospital 1, and therefore more resources are made available to further develop the innovation. Conversely, medication@home is not adopted yet in hospital 5, and therefore it is neither formally ratified yet, nor are resources made available to carry out the project.

To conclude, the adoption of medication@home differs per hospital and the adherence to the determinants of innovation as well. In that sense, hospitals can learn from each other about best (and worst) practices in the mProve network. This knowledge exchange and organizational learning should be focused on practical issues. Many different determinants promote the adoption of medication@home, but this research has shown that these determinants are interrelated and that formal ratification is the most important determinant. For example, hospital 1 is relatively far advanced in the formal ratification of medication@home, because it is supported by the board, which also leads to more time and resources available for the project leader to carry out the pilot. Moreover, this study has shown that it is difficult to assess the developmental stage of the innovation, because these stages can overlap. Finally, the network is promising for the adoption of innovations within the hospitals, but should pay more attention to the members' needs.

5.1 Limitations

Despite the interesting outcomes, this study has some limitations. First, the reader should bear in mind that this study is based on the assumption that innovations have a positive impact. The scientific literature used is focused on determinants that support the adoption of innovations, while it is important to remain critical whether an innovation is worth implementing and whether it is beneficial for the long term as well. This optimistic approach is used, because the mProve network already decided that it is important to strive for optimal adoption of the medication@home innovation.

The second limitation is related to the methodology. The design is a case study, which is suitable for this research, because of the possibilities to do an in-depth analyses based on qualitative data. However, the consequence is that both the variables, i.e. the determinants of innovation and the adoption of innovations are measured subjectively, because the perceptions of project leaders and other relevant stakeholders have been used. Not only can perceptions be difficult to compare, there is also a risk of miscommunication and misinterpretation between the researcher and the respondent. Personal experience and knowledge affect the conclusions drawn. Another drawback of this qualitative research is that it is difficult to investigate causality, because there is no way to analyse the data mathematically. So, qualitative research methods are both the power and weakness of this study.

The third limitation regards the scope of this study. This study is unable to encompass the entire group of stakeholders involved in the mProve network. Therefore, the focus is on the project leaders of each hospital and some additional respondents with different functions within one of the hospitals. It is beyond the scope of this study to examine the network in more detail. For the network analysis, the project leaders' perspectives are taken, but it is also interesting to assess the relationships between board members, medical specialists and pharmacists among the hospitals.

5.2 Practical implications and recommendations

This evaluation study on the medication@home innovation and the mProve network contributes to the current transformation in society to move hospital care closer to patients' home by exploring and evaluating this specific case. The determinants that have an impact on the adoption of innovations can be relevant for other health innovations in other settings as well. The most important determinant at the organizational level is formal ratification, because most other determinants derive from there. If the innovation is formally ratified, people are more enthusiastic and committed to develop the innovation.

Furthermore, this study gives insights in a network of hospitals who aim for knowledge sharing and inter-organizational learning. One finding was that members need clarification on the relationship between the network and the organization they represent and that the network should focus on knowledge exchange among the members. From these implications, three points for practitioners can be determined that should be kept in mind when establishing or maintaining a network in a similar context. First, it is important to gather the expectations on the network by the members. This increases support

for the network. Second, goals should be set for the network and attention needs to be paid to the way these goals will be achieved on the short and long term. The third point is to keep it simple. Networks that are established by board members tend to focus on abstract concepts, but small changes at the executive level and exchanging knowledge on practical issues could be the start of something big. If a network proceeds without reflection on the goals in mind and the networking activities, then the network is not responding to members' needs, which involves a risk of withdrawal.

5.3 Theoretical implications and directions for future research

This evaluation study contributes to scientific literature on innovation in public sector organizations and networking activities in the context of hospitals. First, this study focuses on the adoption of innovations in health care, from a public administration perspective. In this way, organizational processes and contexts have been revealed in which the innovation is embedded. Second, this study contributed to the scientific puzzle on how networks can be designed to be beneficial for the associated organizations, because the demands of the network members are explored and the evaluation of the networking activities are evaluated.

From these theoretical implications, two suggestions for future research can be designated. First, a new model is suggested for the determinants of innovation at the organizational level. This model is based on the determinants indicated by Fleuren et al. (2014a) and tries to rank these determinants based on their importance. It is worth investigating whether different weights can be assigned to the determinants. That research would require a more quantitative approach. Second, this evaluation study is a snapshot of the case. It is worthwhile repeating this study in a year. By then, the new network structure with expert groups where more practical issues are discussed is in place and the hospitals are probably further with the adoption of the medication@home innovation. It is also interesting to use a comparative case study design, where two or three hospitals are compared and at least five respondents per hospital are included in the sample. This gives the opportunity to study the hospitals and the network more detailed.

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Appendices

Appendix I: Topic-list

Topics	**Questions**
Background respondent	What is your (educational) background?
	How are you involved in medication@home?
Adoption of medication@home within hospital X	What medicines or carepaths do you deliver at home? For how long have you been doing that? (OA1)
	How is medication@home embedded in your hospital? Part of an innovation program just on its own? (OA1)
	What is the goal for medication@home within hospital X? (OD1)
	How far is hospital X in achieving that goal? (OA1)
Determinants of innovation – organizational level	
Formal ratification	Has the management set up formal arrangements in your organization relating to the use of medication@home (in policy plans, work plans and so on)? (OD1)
	Do you feel like medication@home is supported by the board of the hospital? (OD1)
	To what extent is medication@home embedded in the organization? (OD1)
Coordination / knowledge management	Is someone or more people designated to coordinate the implementation process of medication@home? How is the coordination going? (OD9)
Resources	Are there enough resources available in your organization to use medication@home, for instance materials to deliver medication@home or financial resources? (OD2 and OD3)
Information access	Can you find information about the use of medication@home easily? (OD8)
Adequate staffing	Is the current staff enough skilled to work with medication@home? (OD5)
Time available	Is there enough time available to implement medication@home? (OD7)
Organizational changes/turbulence	Are there, in addition to the implementation of medication@home, any other changes in the organization affecting the implementation of medication@home now or in the foreseeable future (reorganization, merger, cuts, staffing changes, other innovations)? (OD4)
	Are there any other organizational factors that may influence the implementation of medication@home?

Organizational learning	How is learning from previous experiences ensured within your hospital? Is that embedded in structural institutions? (OD8)
Knowledge management	Is there sufficient exchange between the project group medication@home and responsible managers/board members? (OD10)
	Is the knowledge gained on medication@home valuable for other innovation projects? (OD10)
	Can knowledge gained on other innovation projects be used for medication@home? (OD10)
Network around medication@home – project leaders' perspective	Please have a look at this list with organizational units and actors who may play a role for medication@home. Guiding questions: (ND1) 1 Which units are wrongly added to this list and why? 2 Which units are missing on this list and why? 3 With whom do you as a project leader have the most contact? 4 Who are in the project team of medication@home within your hospital?
Cooperation within mProve network	What is the function and goal of the collaboration within the mProve network? (NA4 and ND4)
	Do you feel like every hospital is committed to the same goals? (NA4)
	What are the most important topics discussed in the network?
	How do you perceive the network's activity, for example: frequency of meetings; value of knowledge exchanged? (NA1)
	What are the current revenues of the network? For example in terms of knowledge gained on medication@home or lower costs for the hospital? (OA4)
	Does the network enhance the legitimacy for the hospital to implement medication@home? (OA2)
	How do you manage the balance between the organizations and networks interests? (ND2)
	How is the transfer of knowledge from the mProve network towards the hospital going? Are you able to bring about change? (OD10)
	Is the network helpful in stimulating inter-organizational learning? How is that ensured? Is there a leader who is capable of coordinating this knowledge management? (ND2 and ND3)
Additional	What would you recommend the board of your hospital or mProve to do in favour of medication@home? (NA3)
	Are there any matters left that you would like to discuss?

All questions are translated in Dutch

Appendix II: Codebook

- Background information respondent
    - Involvement medication@home project
    - Function
- Advice future
    - Advice mProve
    - Advice hospital
- Case
    - Goals for medication@home
    - Evaluation pilot
    - Other treatments provided at home
    - Project group hospital
    - Carepath
- Support own hospital
    - Departments
    - Board members
        - Managerial responsibility
- External contacts outside mProve
- Factors within organisation
    - Business case
    - Finance
    - Formal ratification
    - Resources
    - ICT
    - Information access
    - Organisation development
    - Staff capacity
    - Time available
- Investment in mProve
- mProve network
    - Goal of cooperation
    - Knowledge sharing within network
    - Added value mProve
    - Network organisation
    - Revenues
    - Topics
    - Differences hospitals
- Structure within hospital
    - Embedding in organization
    - Knowledge sharing within hospital
    - Organisational structure within hospital
        - Upscaling
        - Hospital care at home
- Relationship mProve-hospital
    - Legitimacy
    - Translation mProve to hospital

All codes are translated in Dutch